

IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

APPLICATION FOR
UNITED STATES UTILITY PATENT

SCREEN ASSEMBLIES FOR SHALE SHAKERS

Extra Set Claims - 1-20 - For PTO Examiner

INVENTORS

THOMAS C. ADAMS
HAYNES SMITH
JAMES ADAMS
CHARLES NEWTON GRICHAR
KERRY WARD
GEORGE ALEXANDER BURNETT
KENNETH W. SEYFFERT
GUY L. MCCLUNG, III

1 1. A method for mounting a screen assembly to a screen
2 mounting structure of a vibratory separator to facilitate sealing
3 of an interface between the the screen assembly and the screen
4 mounting structure, the screen mounting structure including a
5 plurality of support members extending from a first separator side
6 of the vibratory separator to a second separator side thereof with
7 material flowable between said sides in a first direction that is
8 a direction generally parallel to said sides, the screen assembly
9 having a support and screening material on the support for treating
10 material introduced to the vibratory separator, the support
11 including four interconnected sides including two pairs of sides,
12 a first pair with a first side and a second side and a second pair
13 with a third side and a fourth side, the first side spaced-apart
14 from the second side by spaced-apart third and fourth sides, the
15 first side and the second side generally parallel to the first
16 separator side and the second separator side upon installation of
17 the screen assembly in the vibratory separator, the support having
18 generally screening material thereon, the support having a
19 plurality of spaced-apart crossmembers extending between and
20 connected to only one of the pairs of sides, each crossmember not
21 in contact with and independent of all other crossmembers, the
22 screen mounting structure including crowning apparatus for forcible
23 abutment against the third side and the fourth side of the support
24 to effect bending of the first side and the second side of the
25 support and thereby effect crowning of the screen assembly within
26 the vibratory separator, the method comprising

27 locating the screen assembly on the screen mounting
28 structure,

29 positioning the screen assembly with respect to the
30 screen mounting structure so that the crossmembers are all
31 either generally transverse to or all generally parallel to
32 the first direction, and

33 forcing the first and second sides of the support

34 down with the crowning apparatus to effect crowning of the
35 screen assembly, the support rigid yet sufficiently flexible
36 so that with the screen assembly in a crowned configuration
37 the third side and the fourth side each along substantially
38 all of the length thereof sealingly contact a surface of the
39 screen mounting structure.

1 2. The method of claim 1 wherein the plurality of spaced-
2 apart crossmembers is two crossmembers generally parallel to the
3 third side and the fourth side.

1 3. The method of claim 1 wherein the plurality of spaced-
2 apart crossmembers is five crossmembers generally parallel to the
3 first direction.

1 4. The method of claim 1 wherein the first side and the
2 second side are each made of material less rigid than material of
3 the third side and the fourth side.

1 5. The method of claim 1 wherein the first side has at least
2 a portion thereof made of material less rigid than material of the
3 third side and the fourth side.

1 6. The method of claim 1 further comprising
2 connecting a seal member at a first location of an
3 exterior of at least one of the first side or the second side
4 to remedy ineffective sealing at said first location.

1 7. The method of claim 6 wherein the seal member has at
2 least a portion thereof within a recess at the first location.

1 8. The method of claim 1 wherein the screen mounting
2 structure has a body with at least one upwardly projecting member

3 projecting upwardly from the body member, said at least one
4 upwardly projecting member sized and configured so it is receivable
5 in a corresponding hole in the support, the method further
6 comprising

7 positioning the screen assembly on the screen
8 mounting structure so that the at least one upwardly
9 projecting member is received in the corresponding hole of the
10 support.

1 9. The method of claim 8 wherein the at least one upwardly
2 projecting member is a plurality of spaced-apart upwardly
3 projecting members and wherein the at least one hole in the support
4 is a plurality of spaced-apart holes, each for receiving a
5 corresponding upwardly projecting member.

1 10. The method of claim 8 wherein the corresponding hole in
2 the support is in a crossmember of the support.

1 11. The method of claim 1 wherein the vibratory separator is
2 a shale shaker for separating components of drilling material
3 introduced thereto, the drilling material including drilling fluid
4 and drilled cuttings, the shale shaker having a basket, the screen
5 mounting structure on the basket, the support having a plurality of
6 spaced apart support holes therethrough, each hole of the plurality
7 of spaced apart support holes for receiving part of a fastener used
8 for releasably connecting the screen assembly to the screen
9 mounting structure, the screen mounting structure having a
10 plurality of spaced-apart deck holes corresponding to the plurality
11 of spaced-apart support holes through the support, and fasteners
12 connecting the screen assembly to the screen mounting structure,
13 each fastener passing through the screening material, through a
14 support hole, and into a deck hole, the method further comprising
15 connecting the support to the screen mounting

16 structure with the fasteners.

1 12. The method of claim 11 wherein the fasteners are from the
2 group consisting of threaded fasteners, screens, bolts, locking
3 fasteners, finger expansion fasteners, air injection fasteners, and
4 friction-fit fasteners.

1 13. The method of claim 11 wherein the fasteners are
2 adhesively secured in place.

1 14. The method of claim 11 wherein the screening material
2 comprises a plurality of layers of screen mesh.

1 15. The method of claim 11 wherein the screen assembly has on
2 the support a perforated plate.

1 16. The method of claim 11 wherein the sides of the support
2 comprise hollow tubular members.

1 17. The method of claim 1 wherein all of the crossmembers are
2 generally transverse to the first direction, the material
3 introduced to the vibratory separator containing solids not
4 passable through the screening material, the solids movable on a
5 top of the screening assembly by the vibratory separator, the
6 method further comprising

7 moving the solids uniformly on the top of the
8 screening assembly.

1 18. The method of claim 17 wherein the material is drilling
2 material and the solids include drilled solids.

1 19. The method of claim 17 wherein the solids are moved on
2 the top of the screen assembly without the formation of significant
3 dead zones on the top of the screen assembly.

1 20. A design for a support for a screen assembly
2 substantially as described and illustrated herein.

1

IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

APPLICATION FOR
UNITED STATES UTILITY PATENT

SCREEN ASSEMBLIES FOR SHALE SHAKERS

Extra Set Drawings - 41 Sheets - For PTO Examiner

INVENTORS

THOMAS C. ADAMS
HAYNES SMITH
JAMES ADAMS
CHARLES NEWTON GRICHAR
KERRY WARD
GEORGE ALEXANDER BURNETT
KENNETH W. SEYFFERT
GUY L. MCCLUNG, III

Fig. 1A

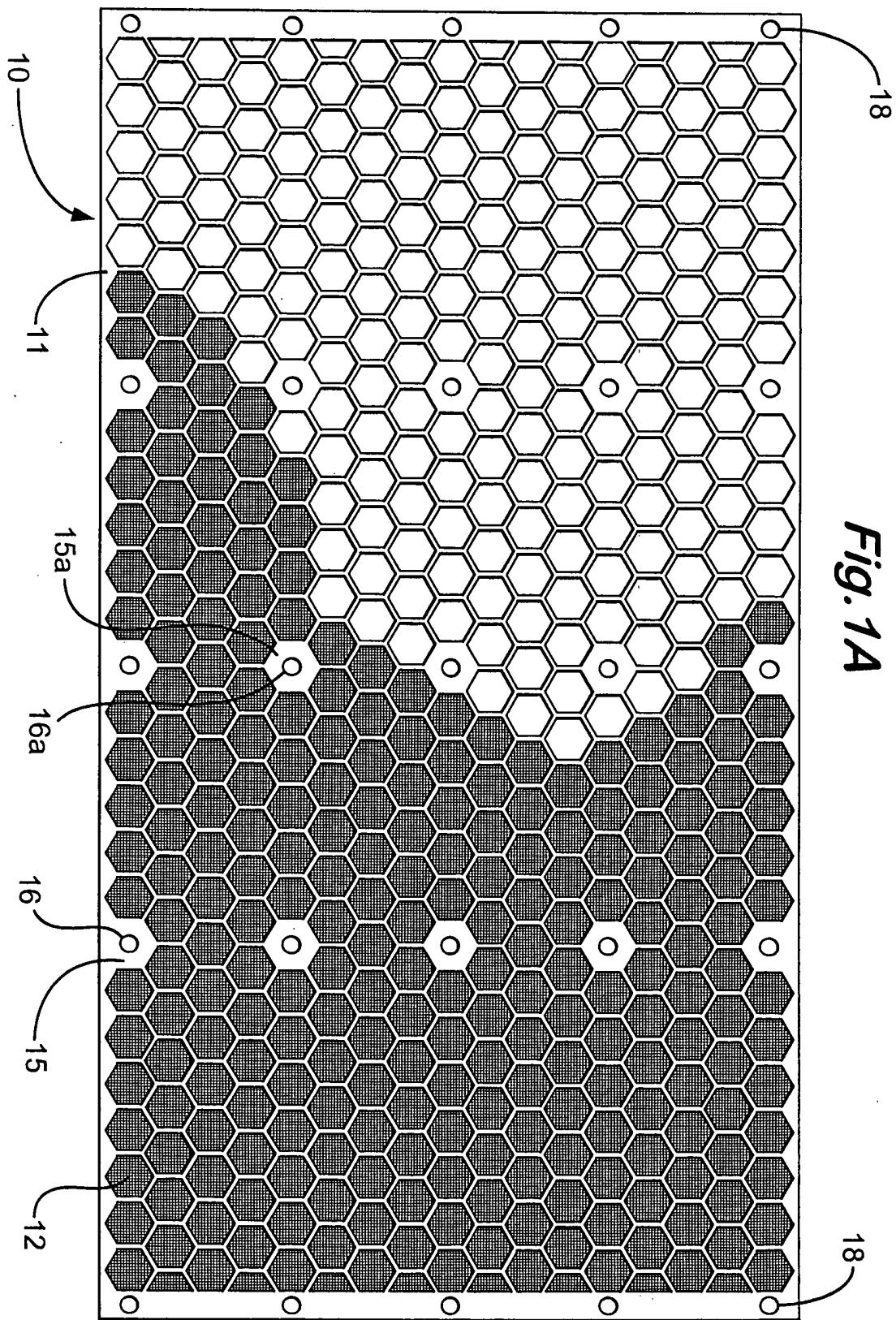


Fig. 1B

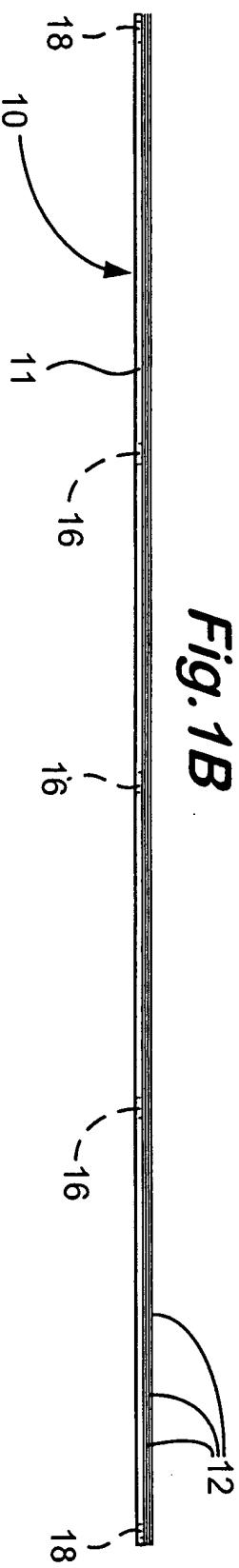


Fig. 2A

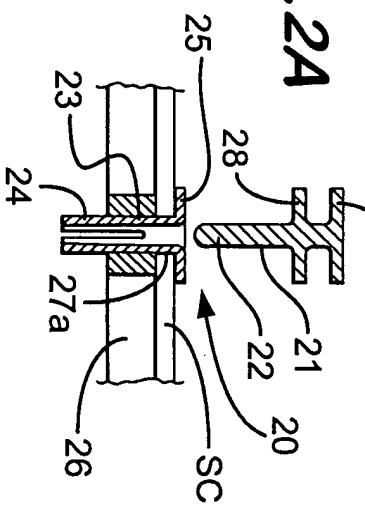


Fig. 3A

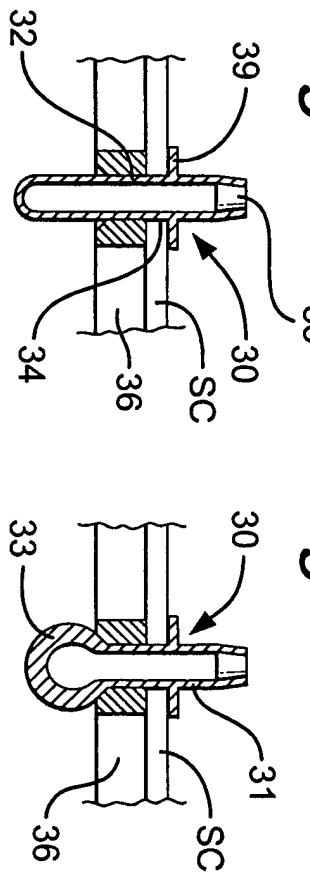


Fig. 3B

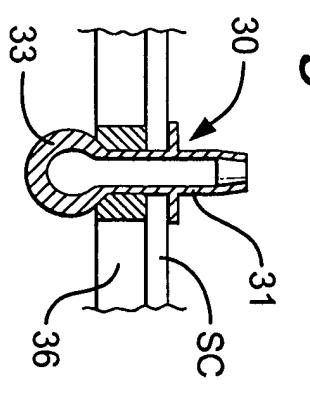


Fig. 4

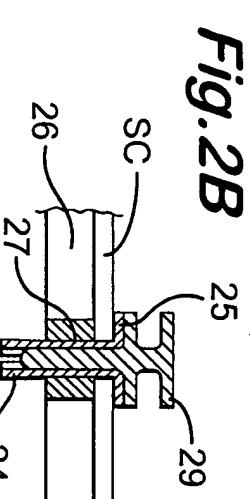
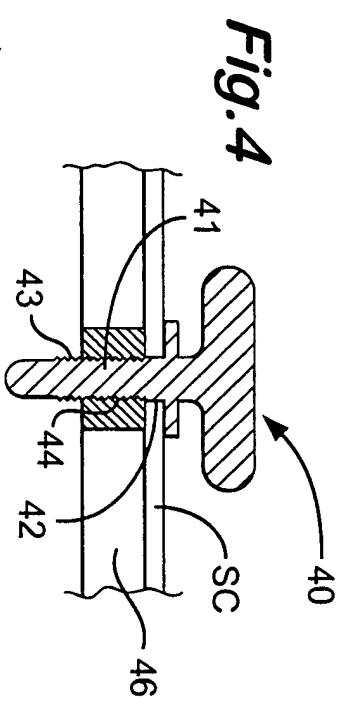


Fig. 2B

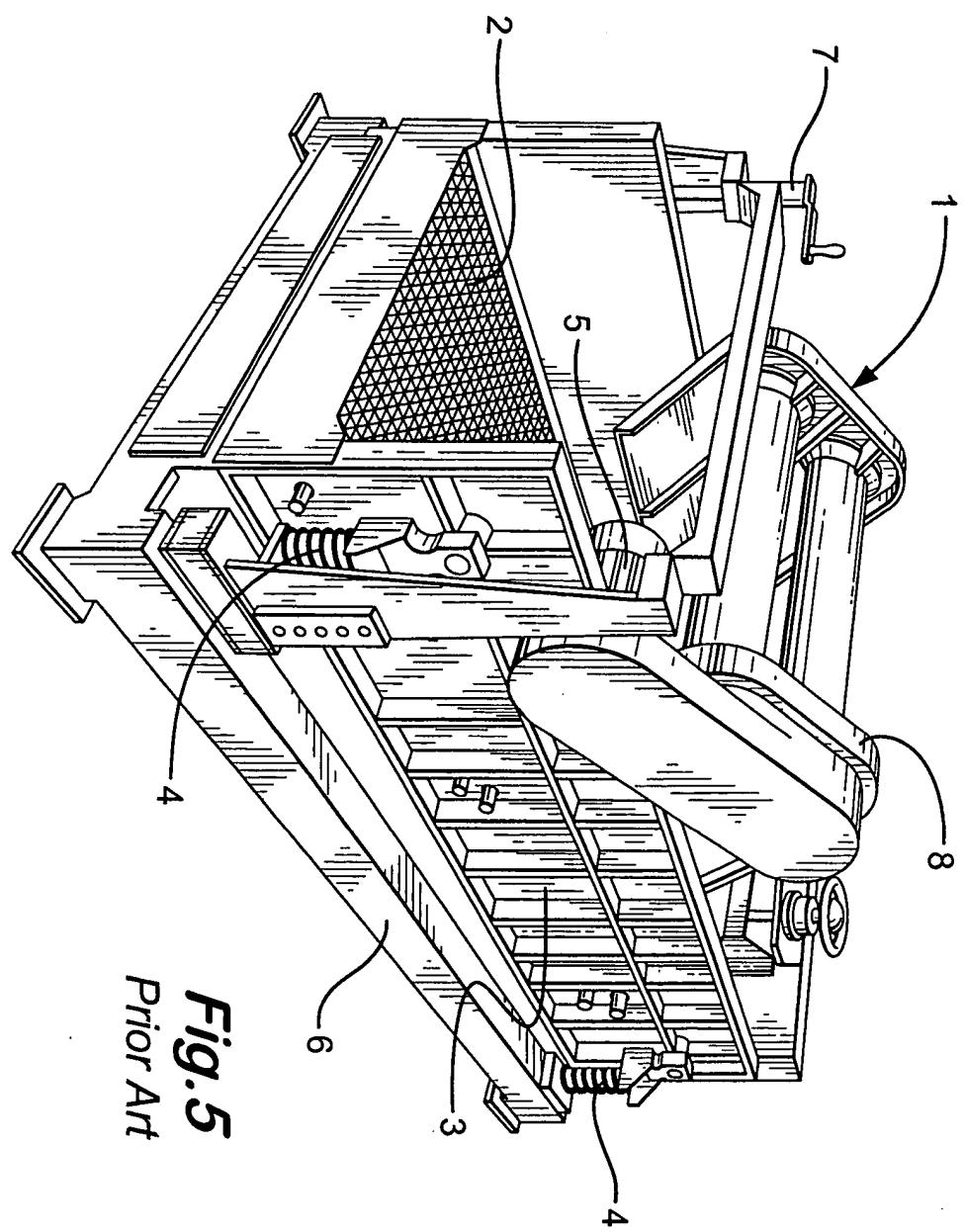


Fig. 5
Prior Art

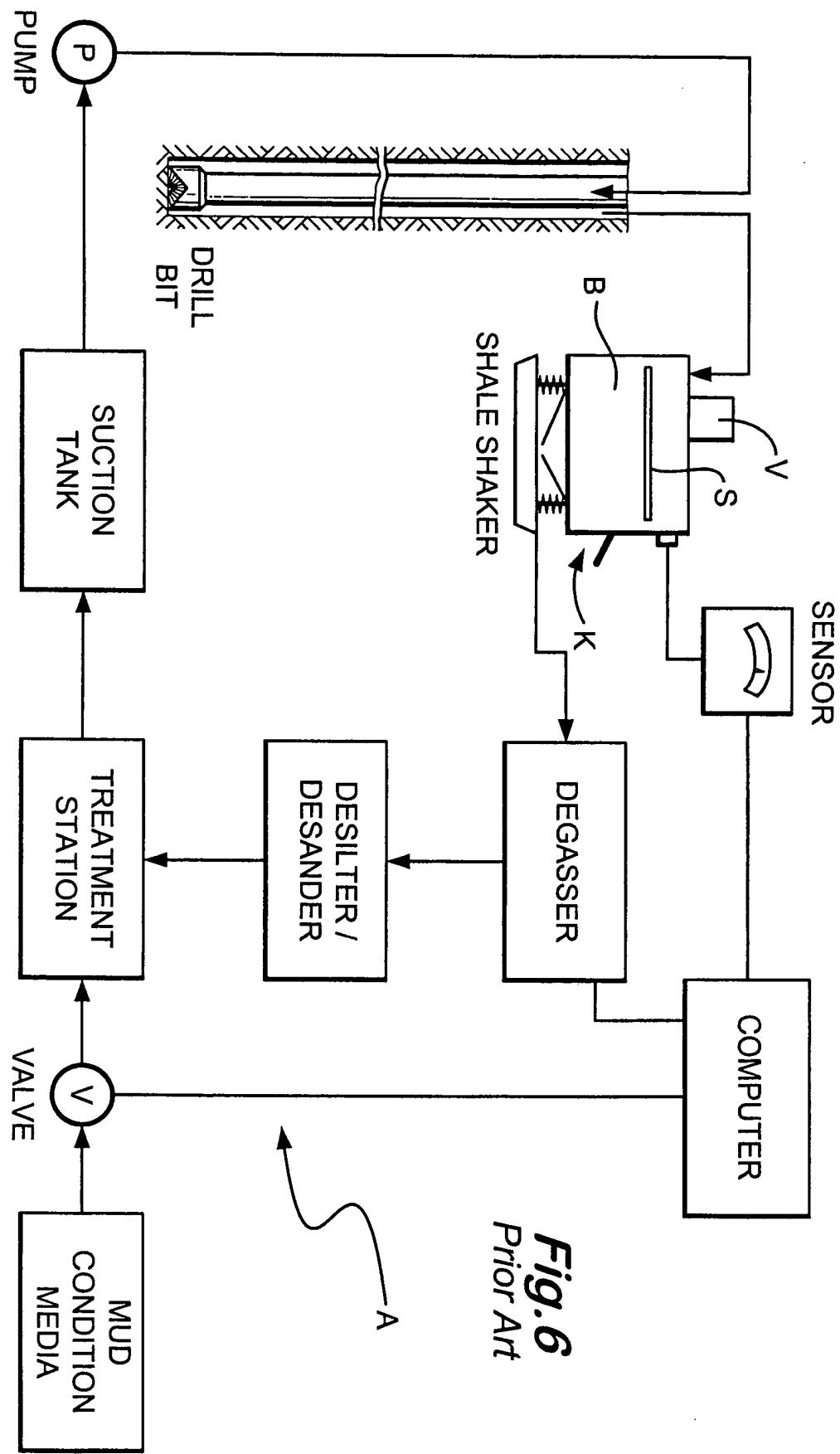


Fig.6
Prior Art

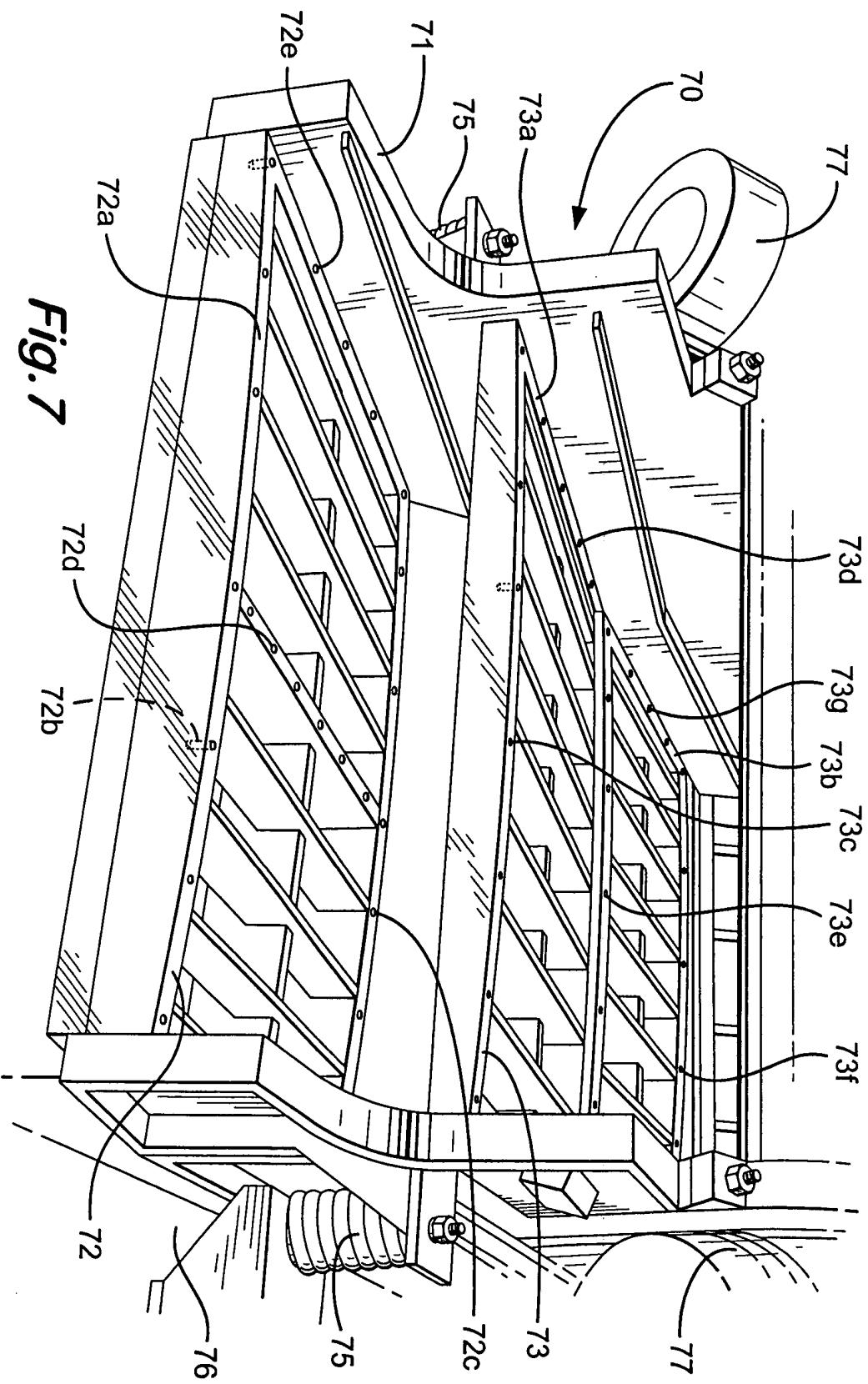


Fig. 7

Fig. 10B

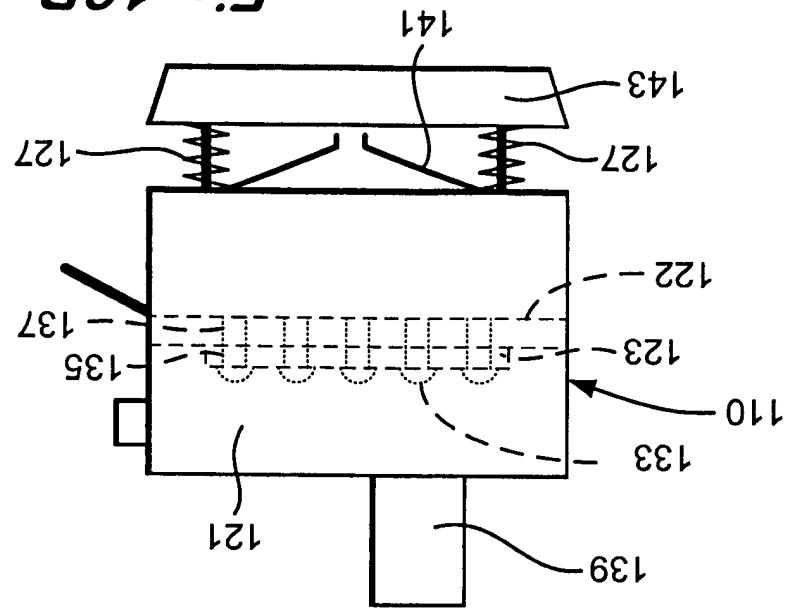
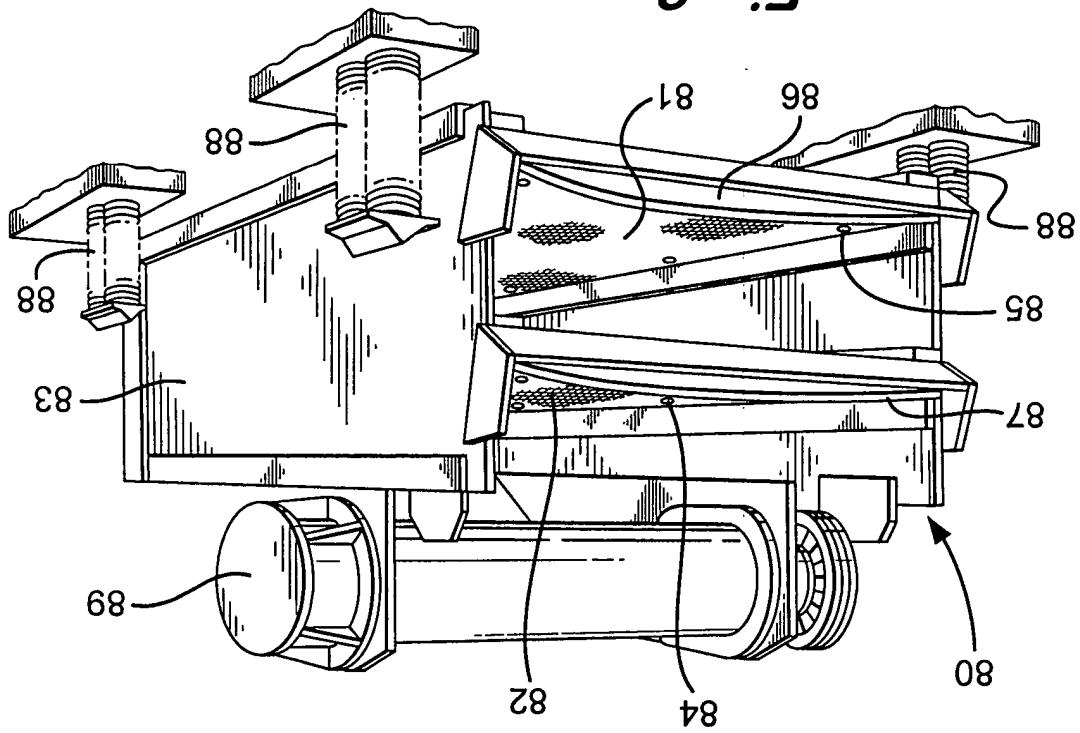
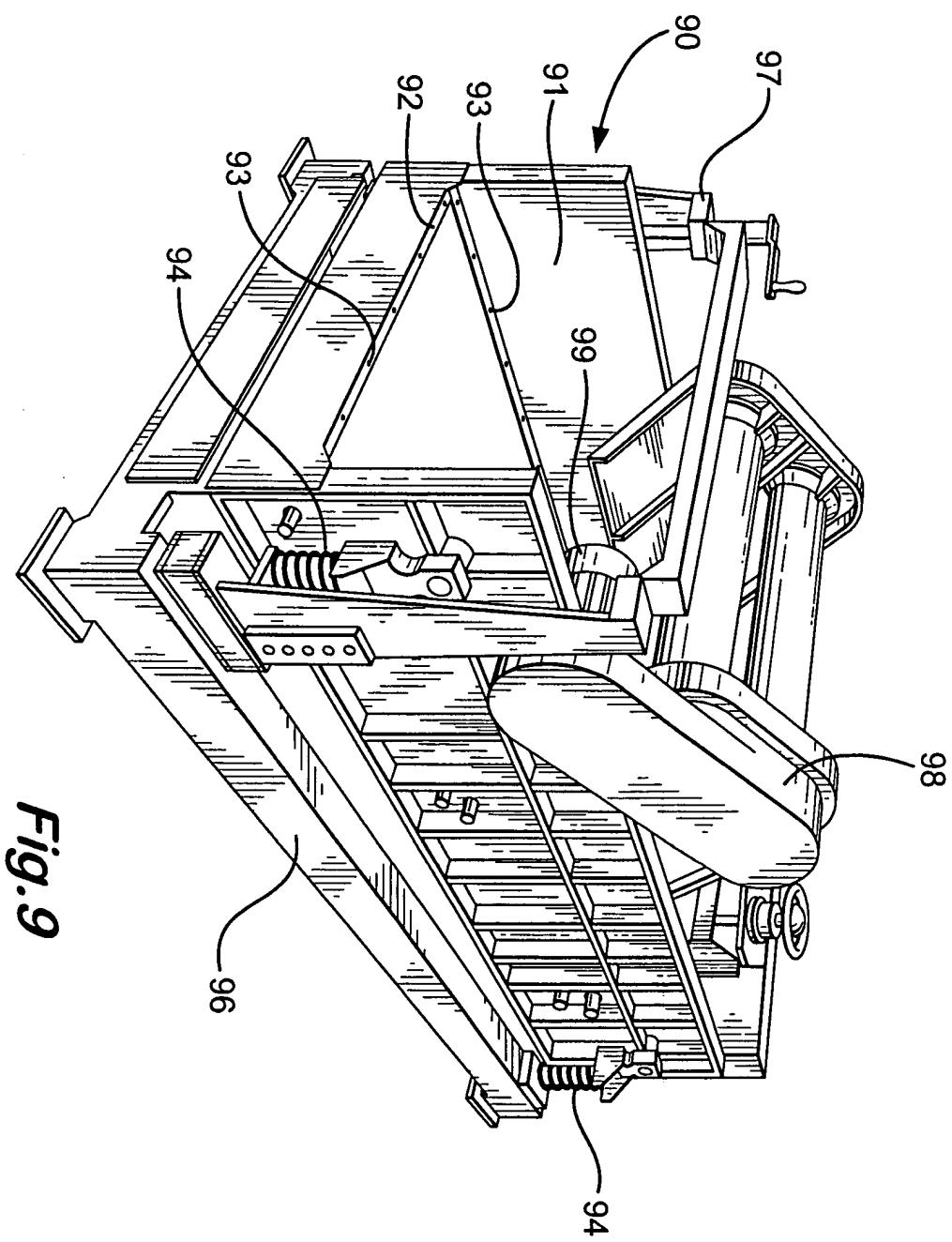


Fig. 8





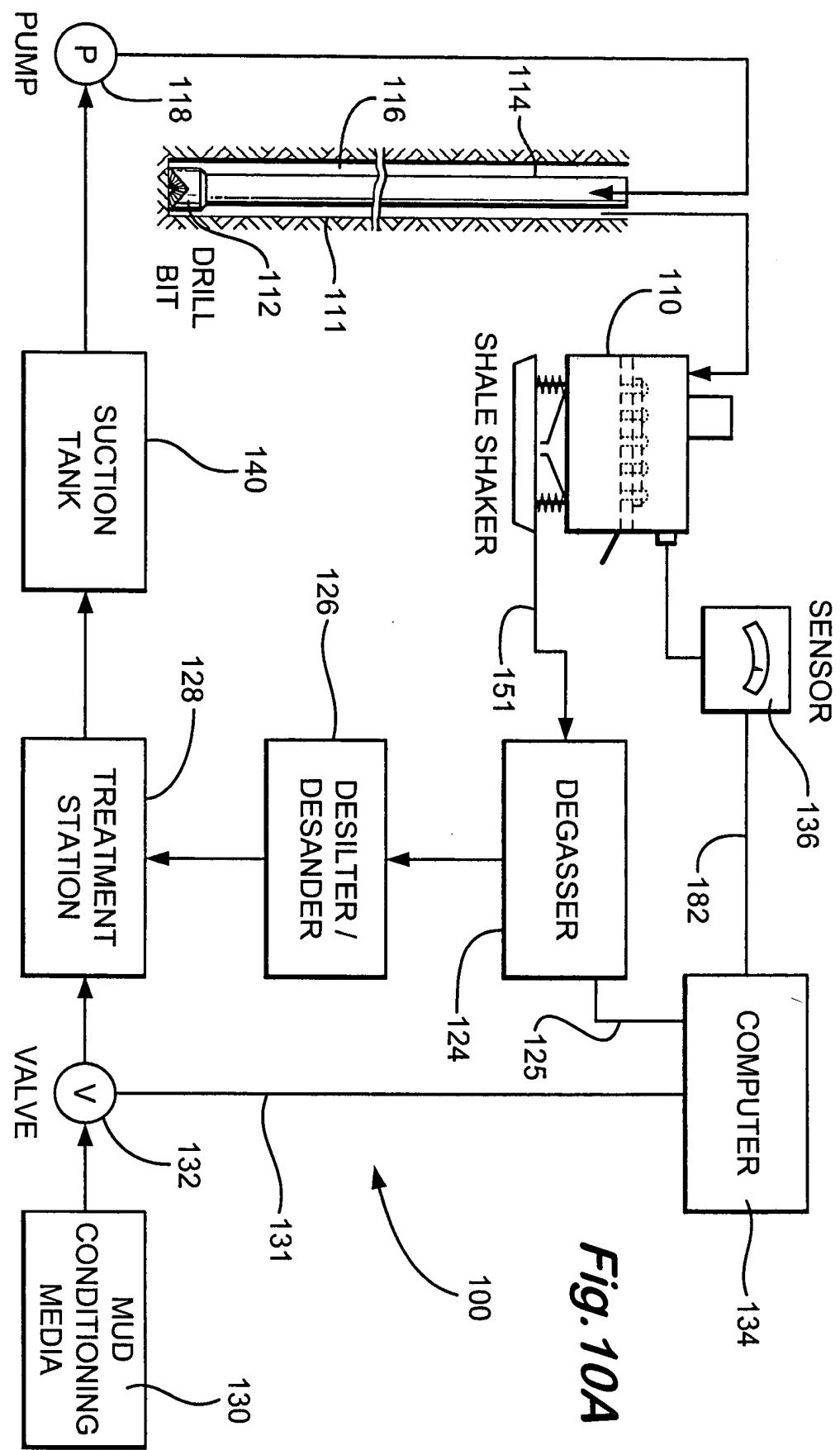


Fig. 10A

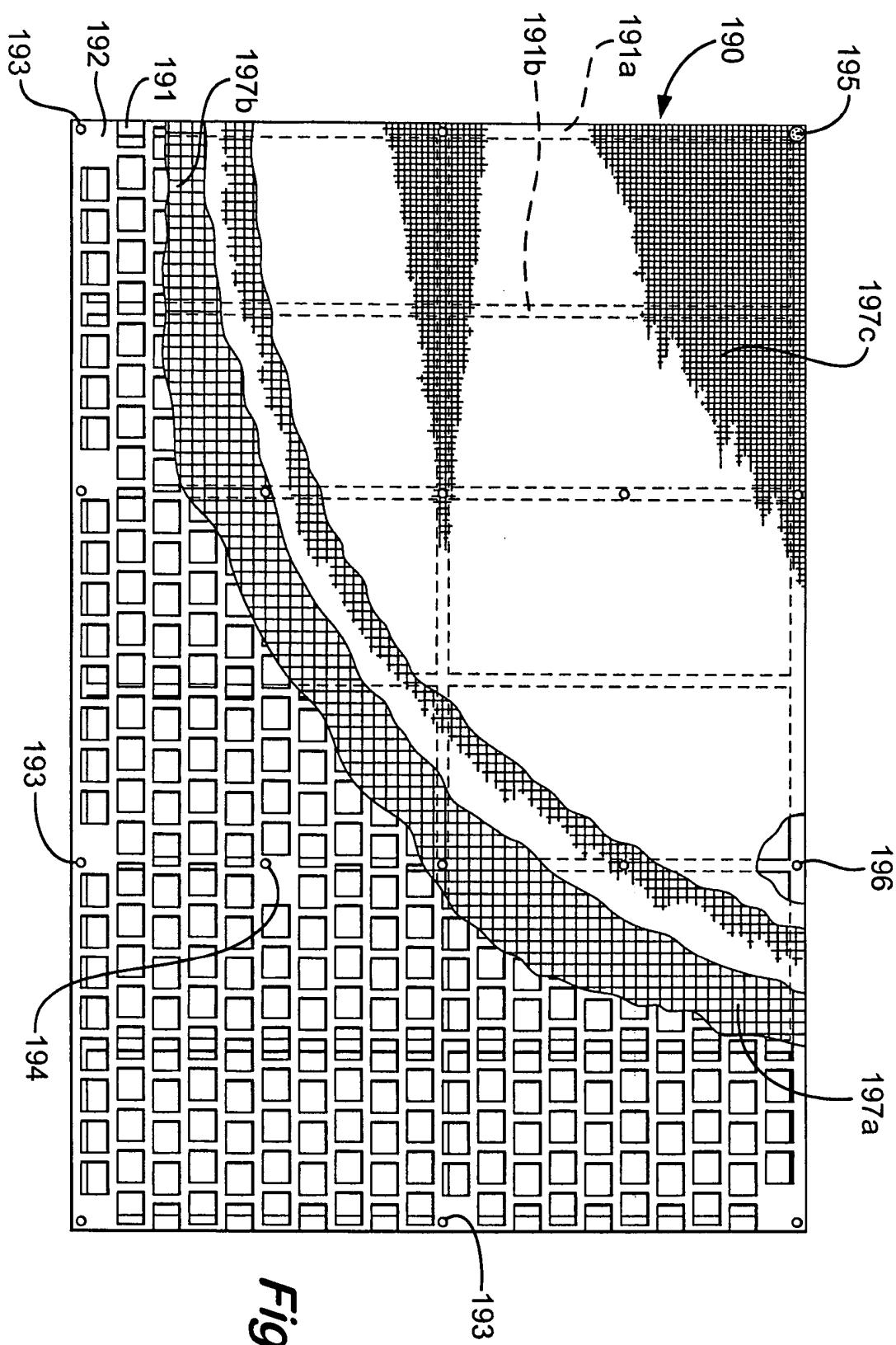


Fig. 11

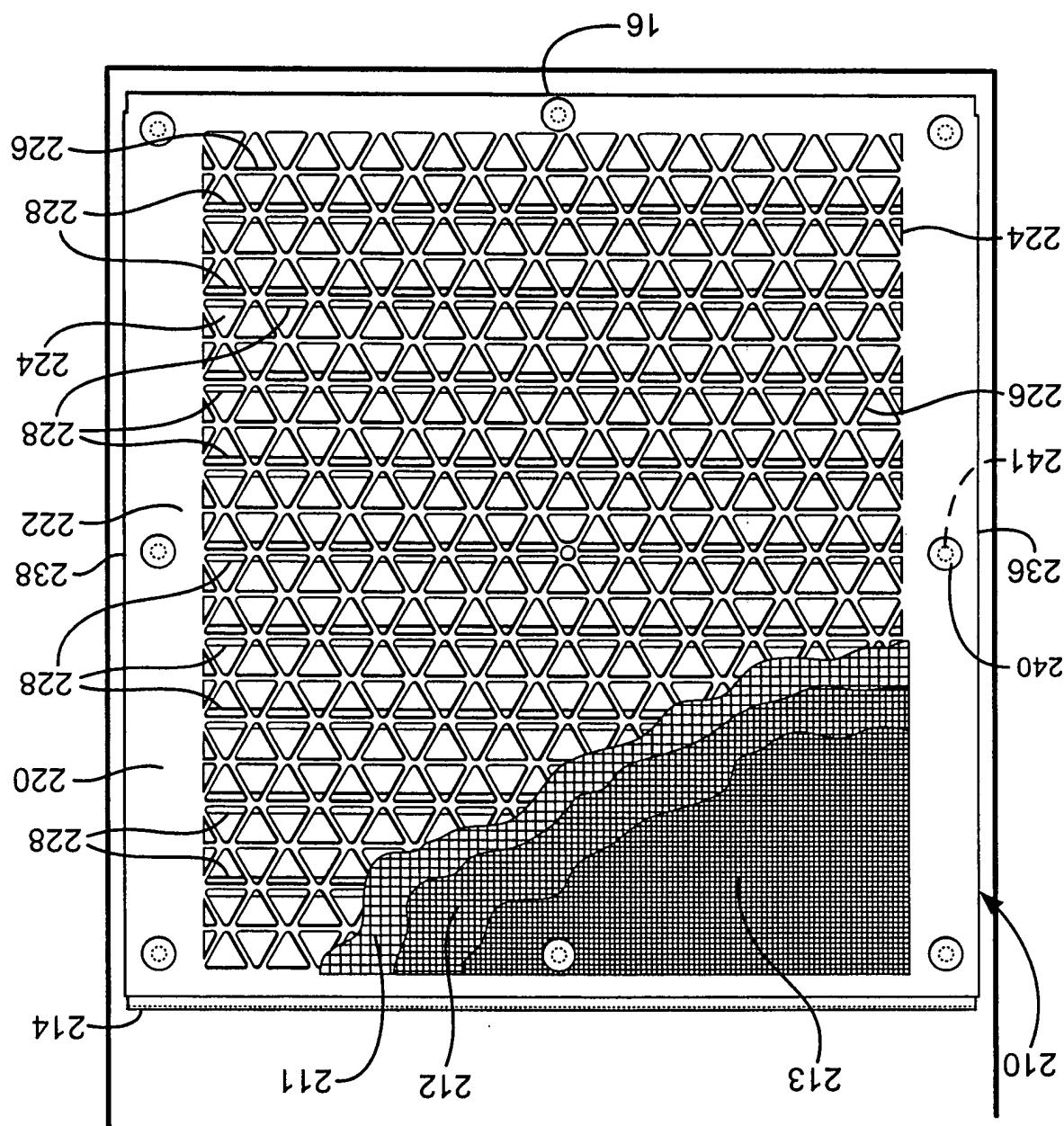
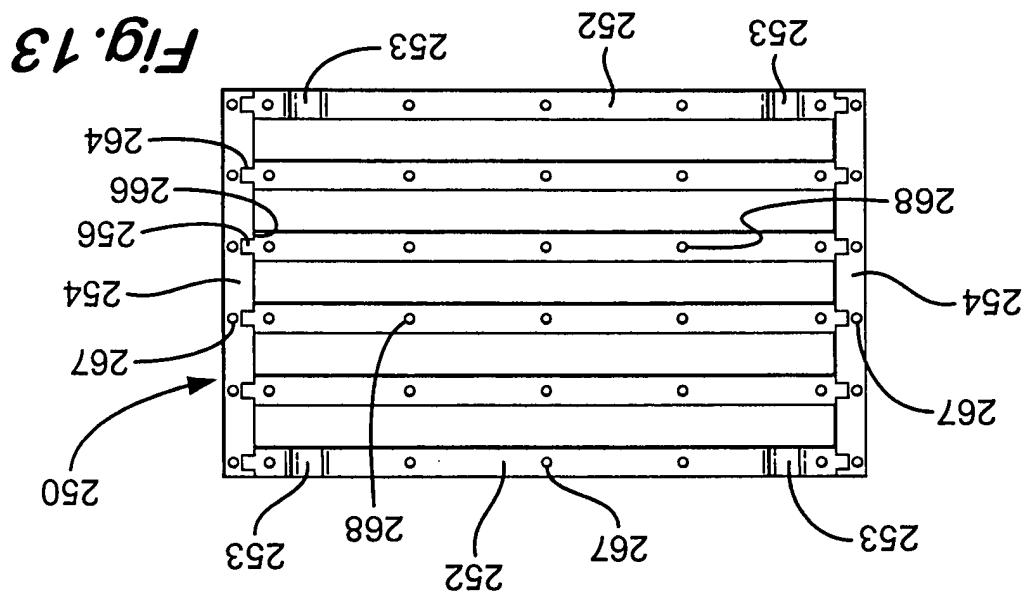
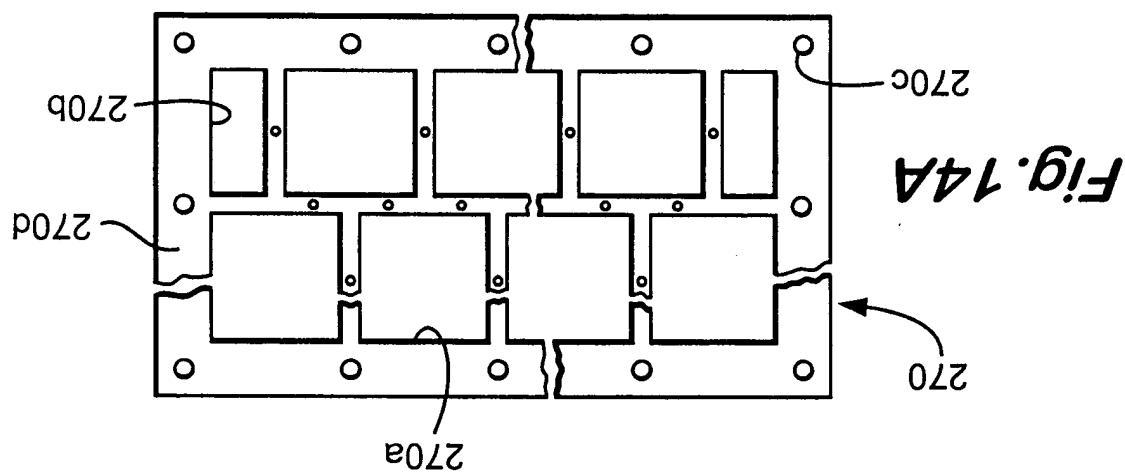
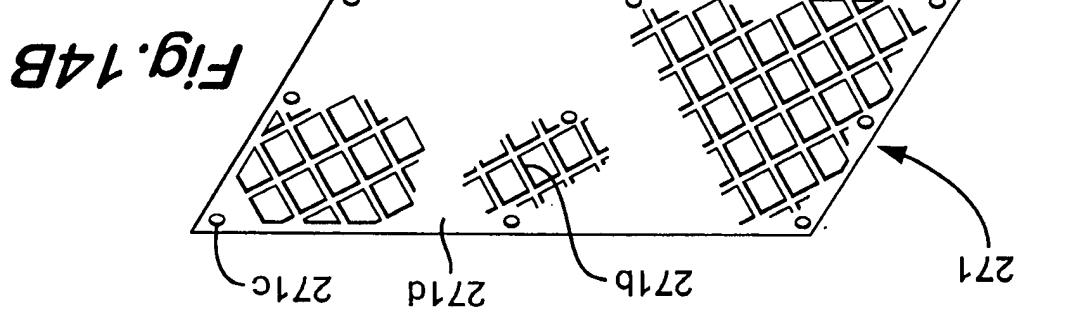


Fig. 12



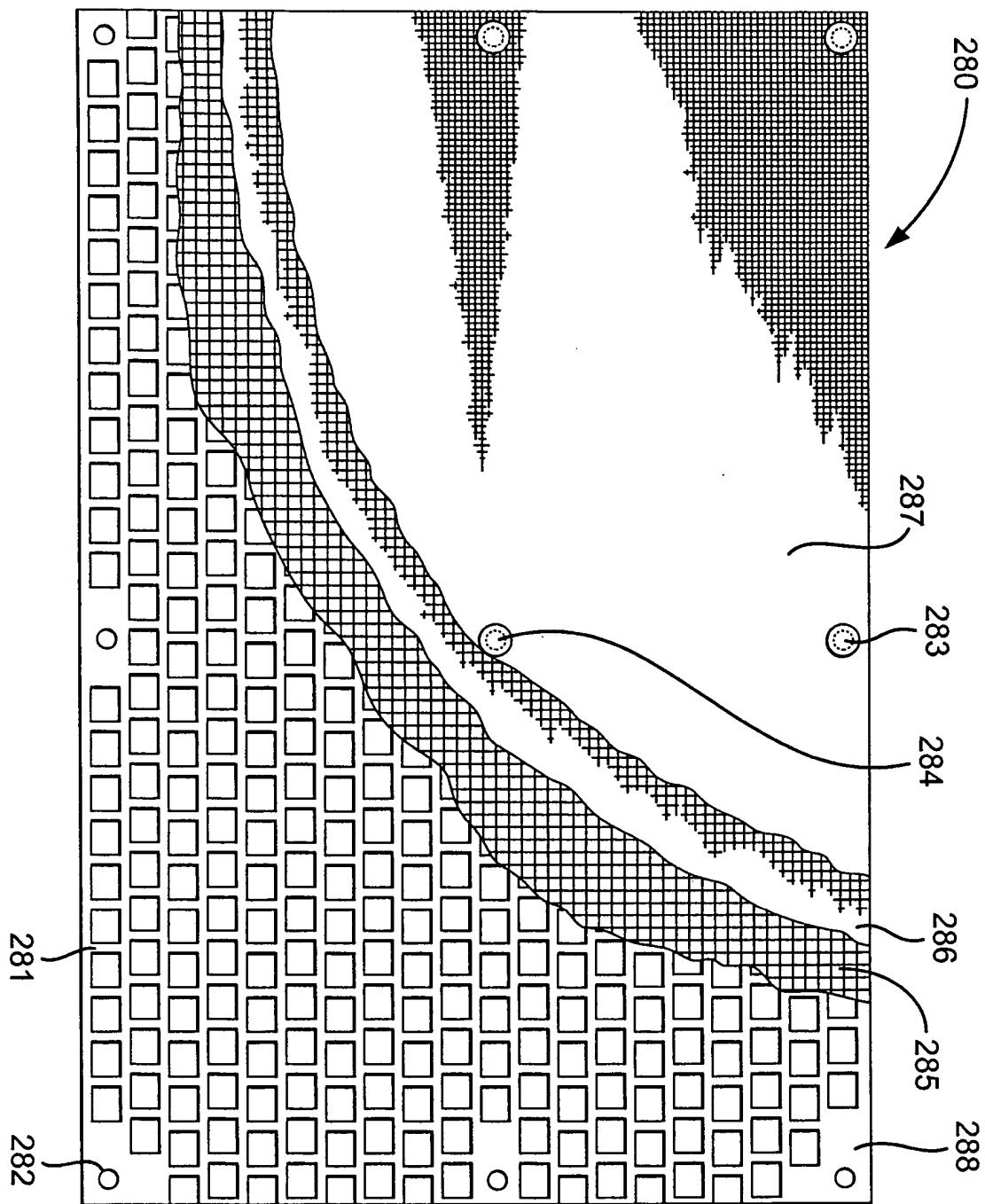


Fig. 15

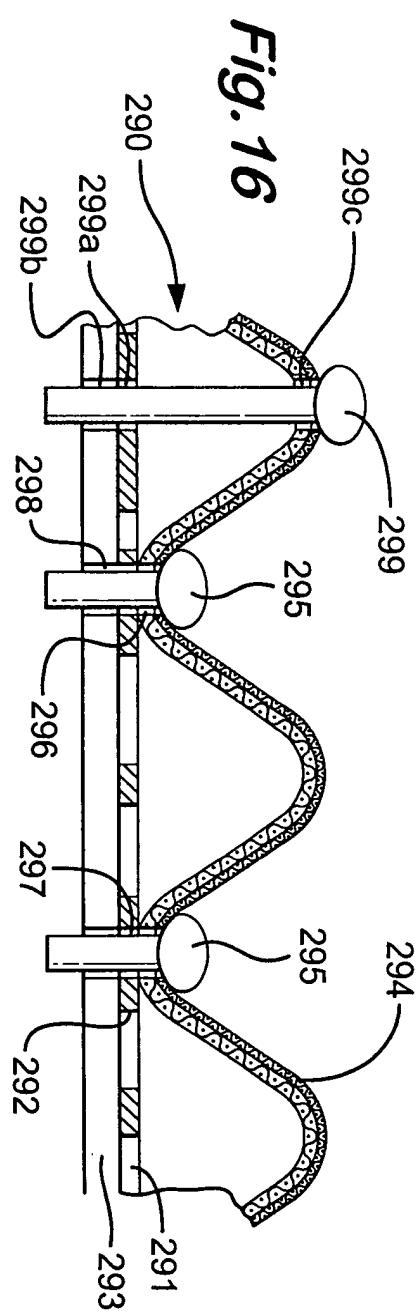
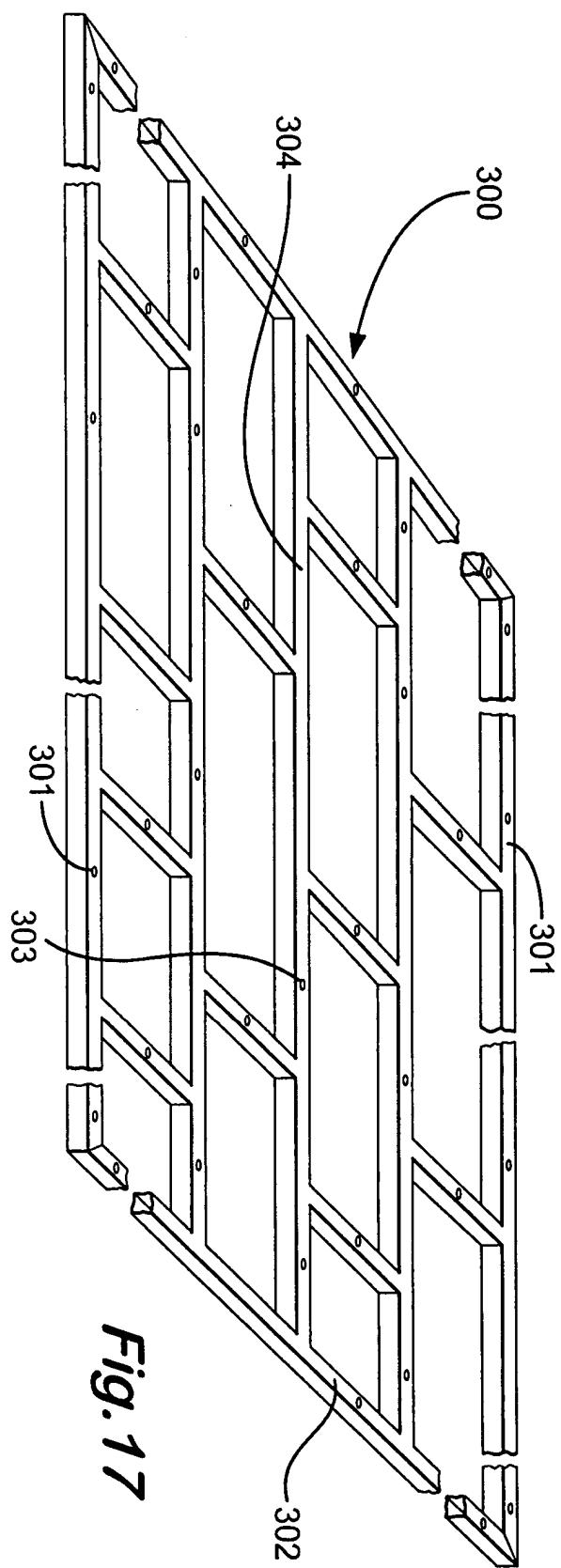
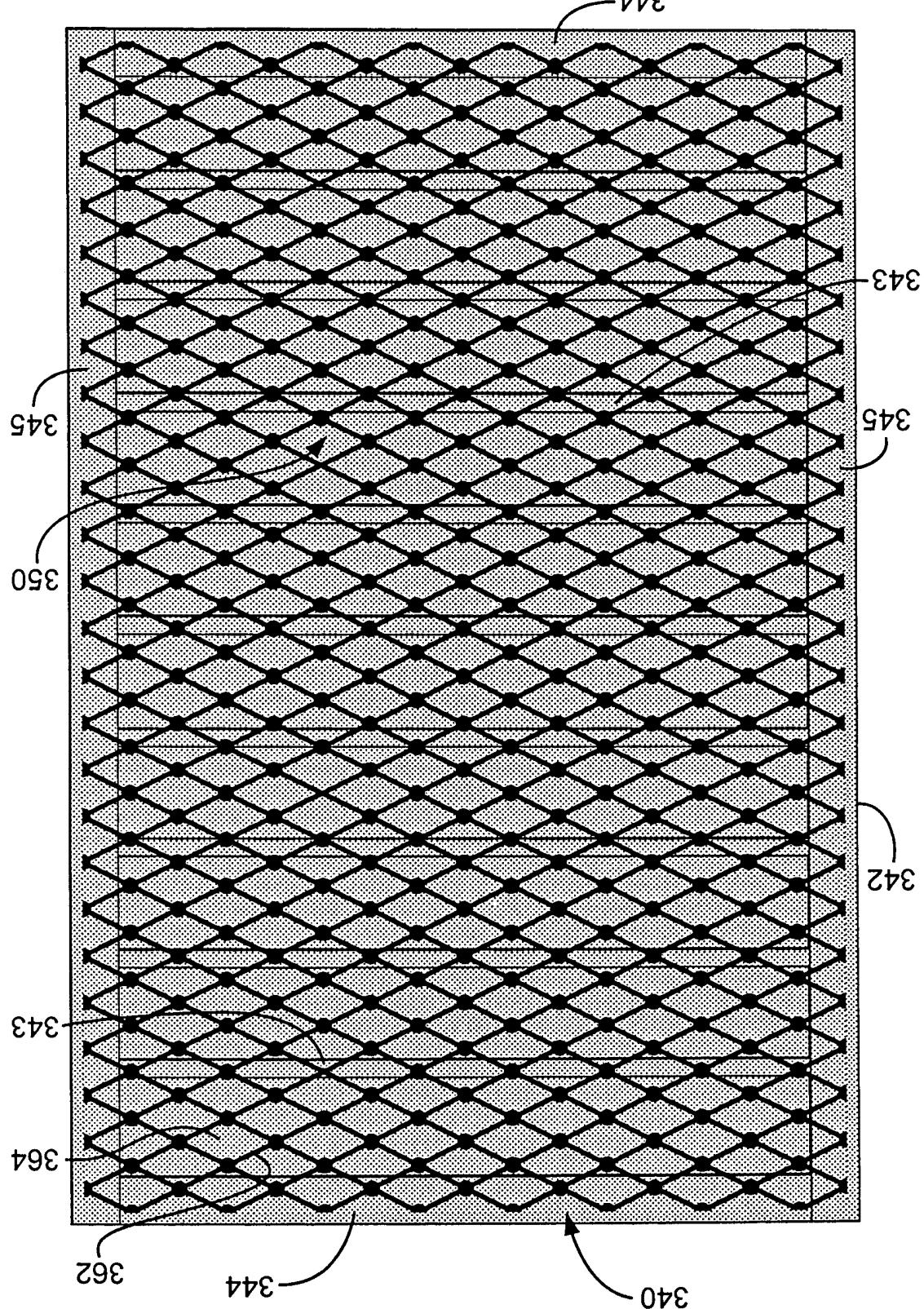


Fig. 18A



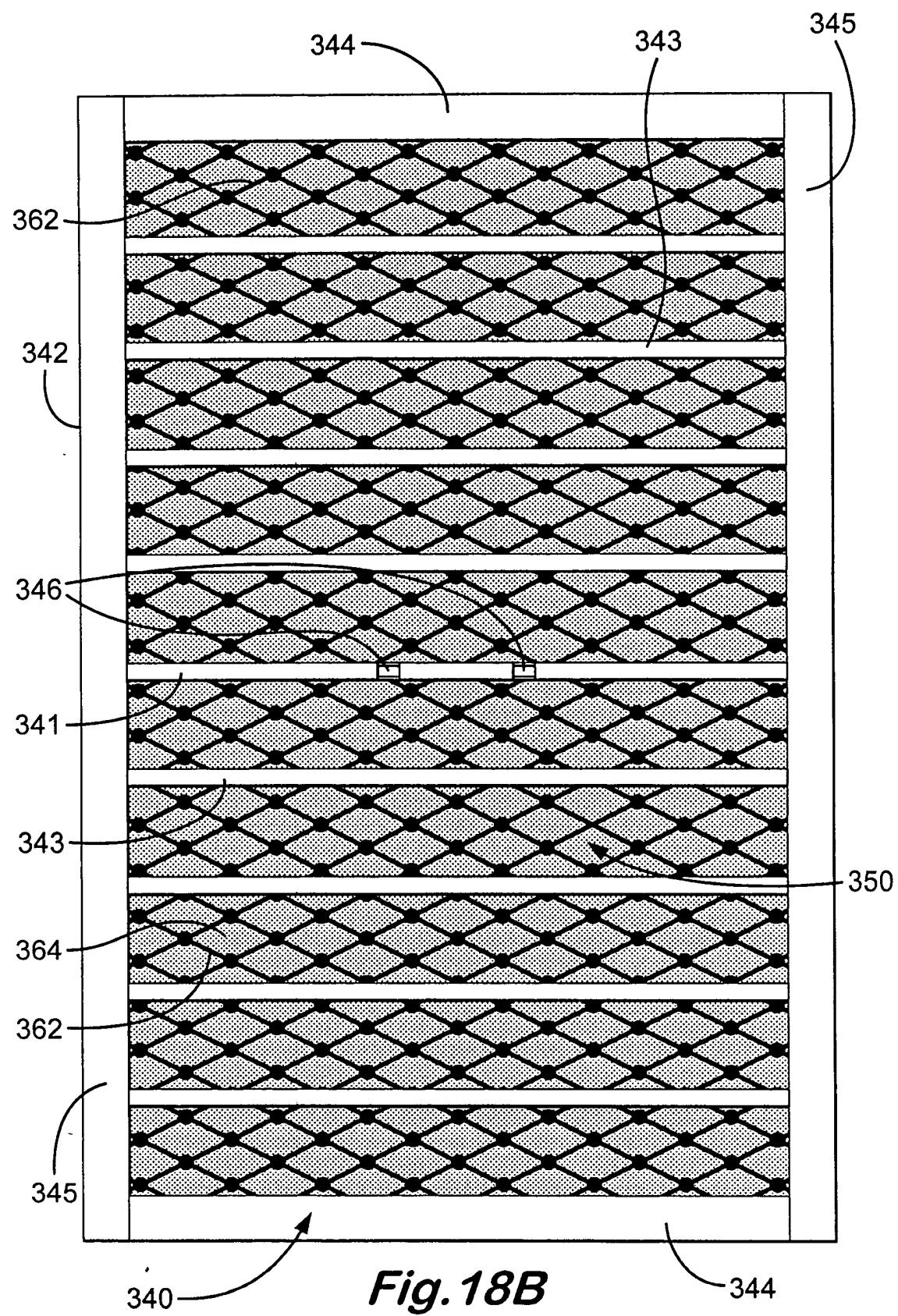


Fig. 18B

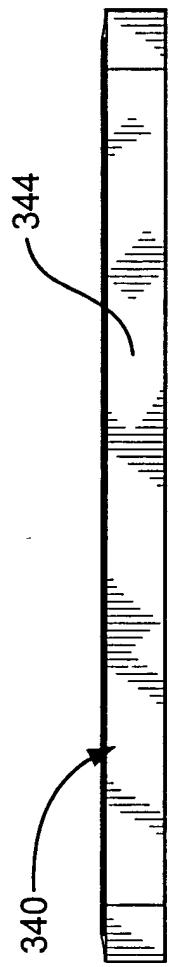


Fig. 18C



Fig. 18D

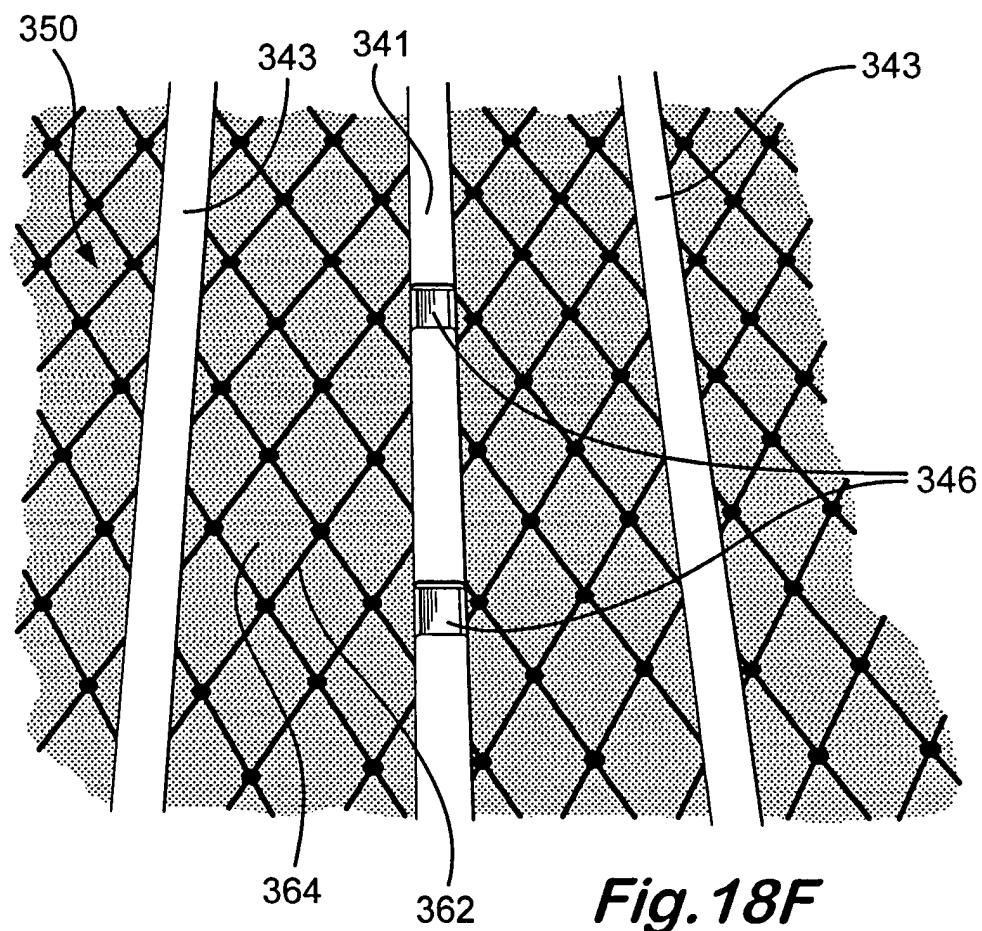
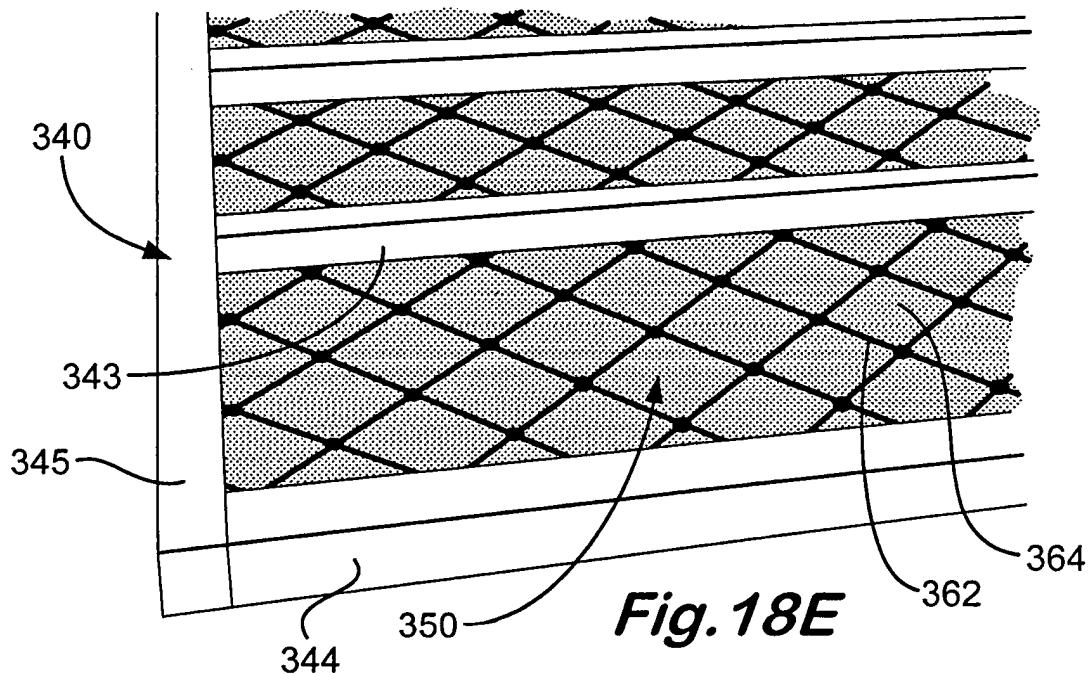
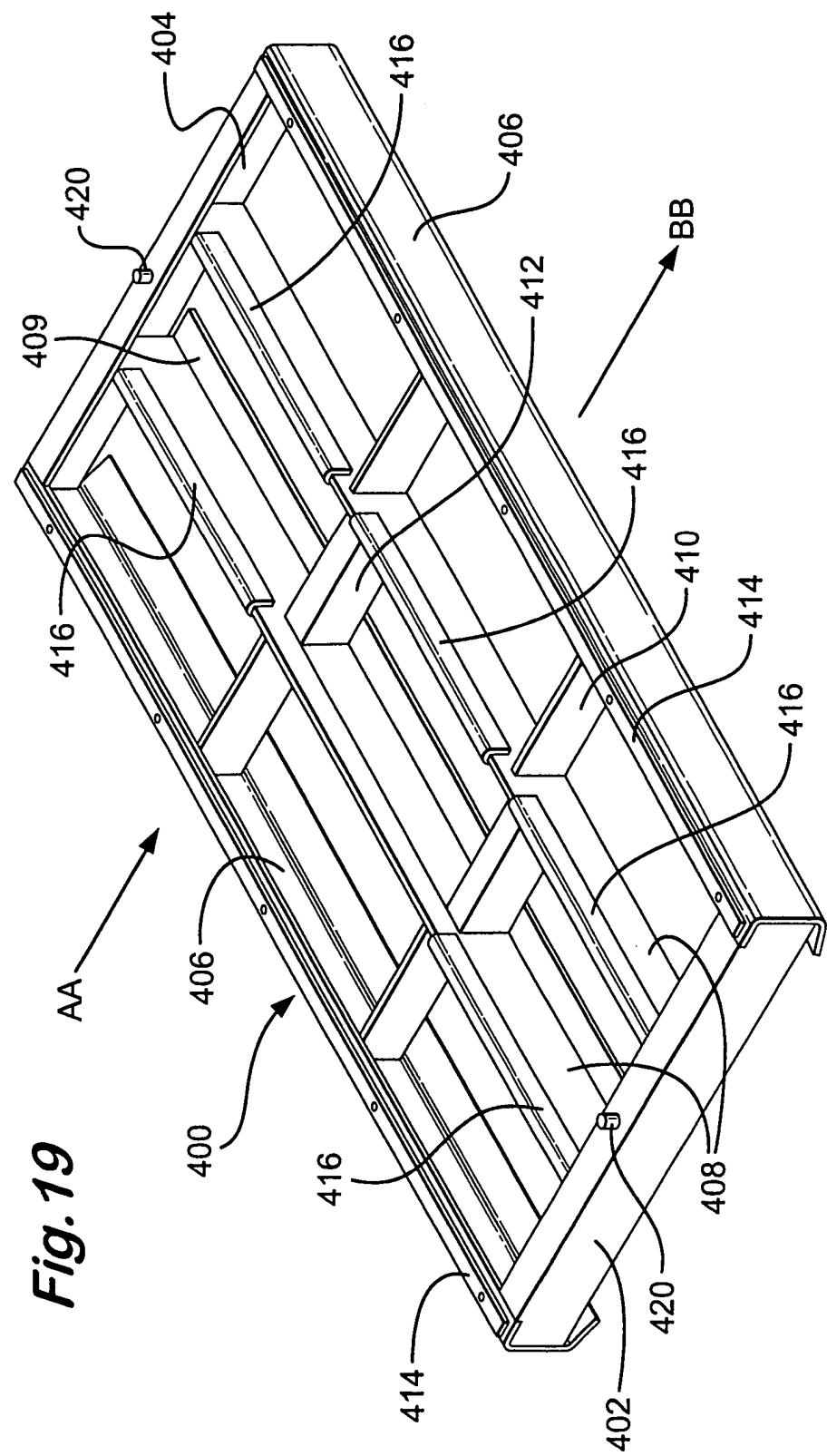


Fig. 19



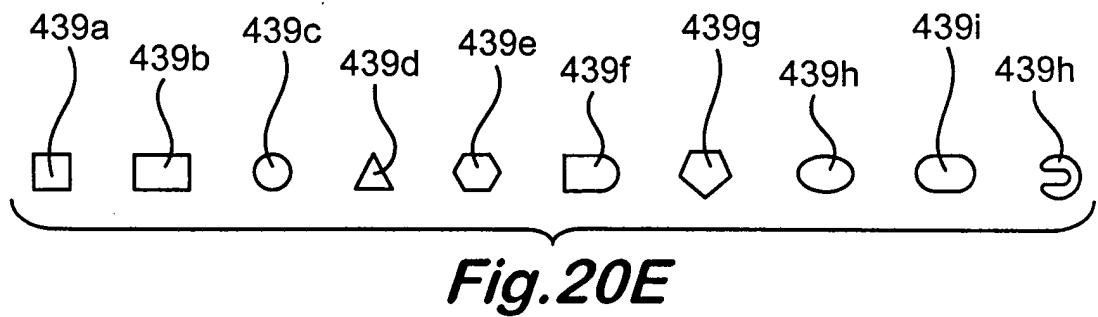
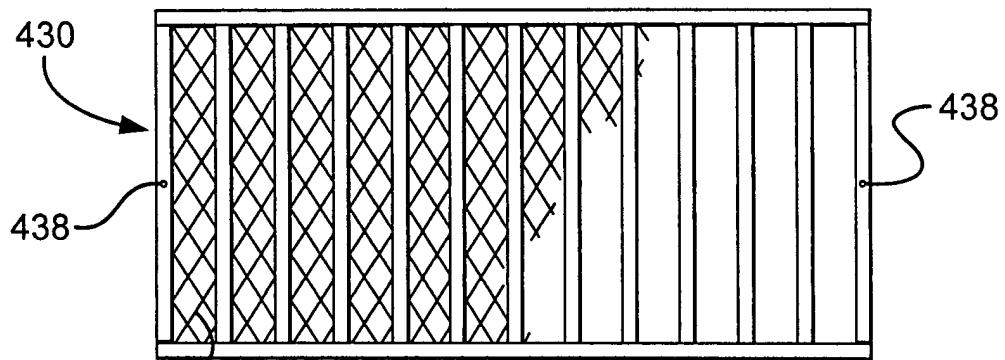
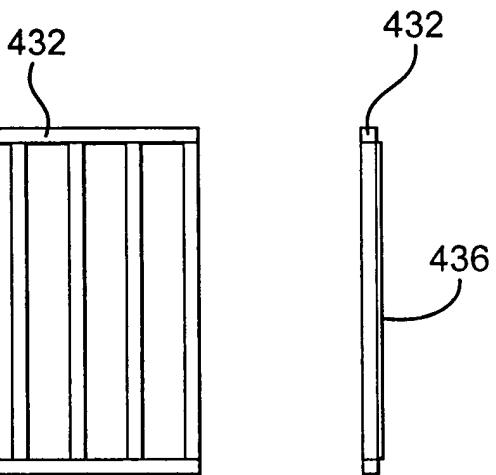
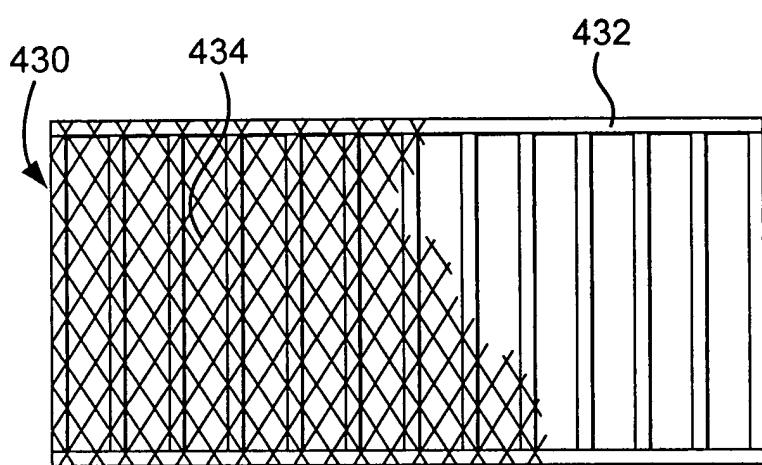


Fig. 21

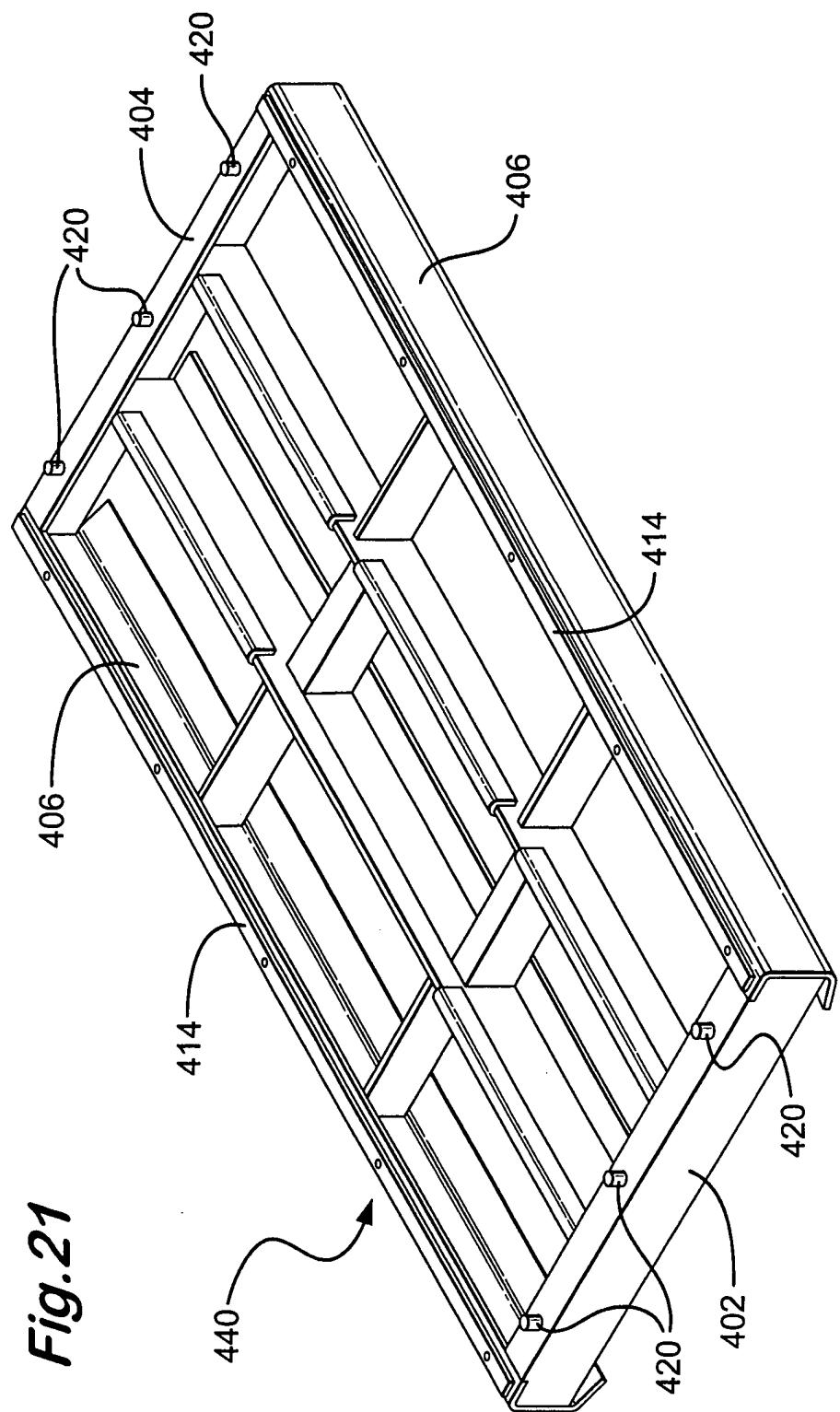
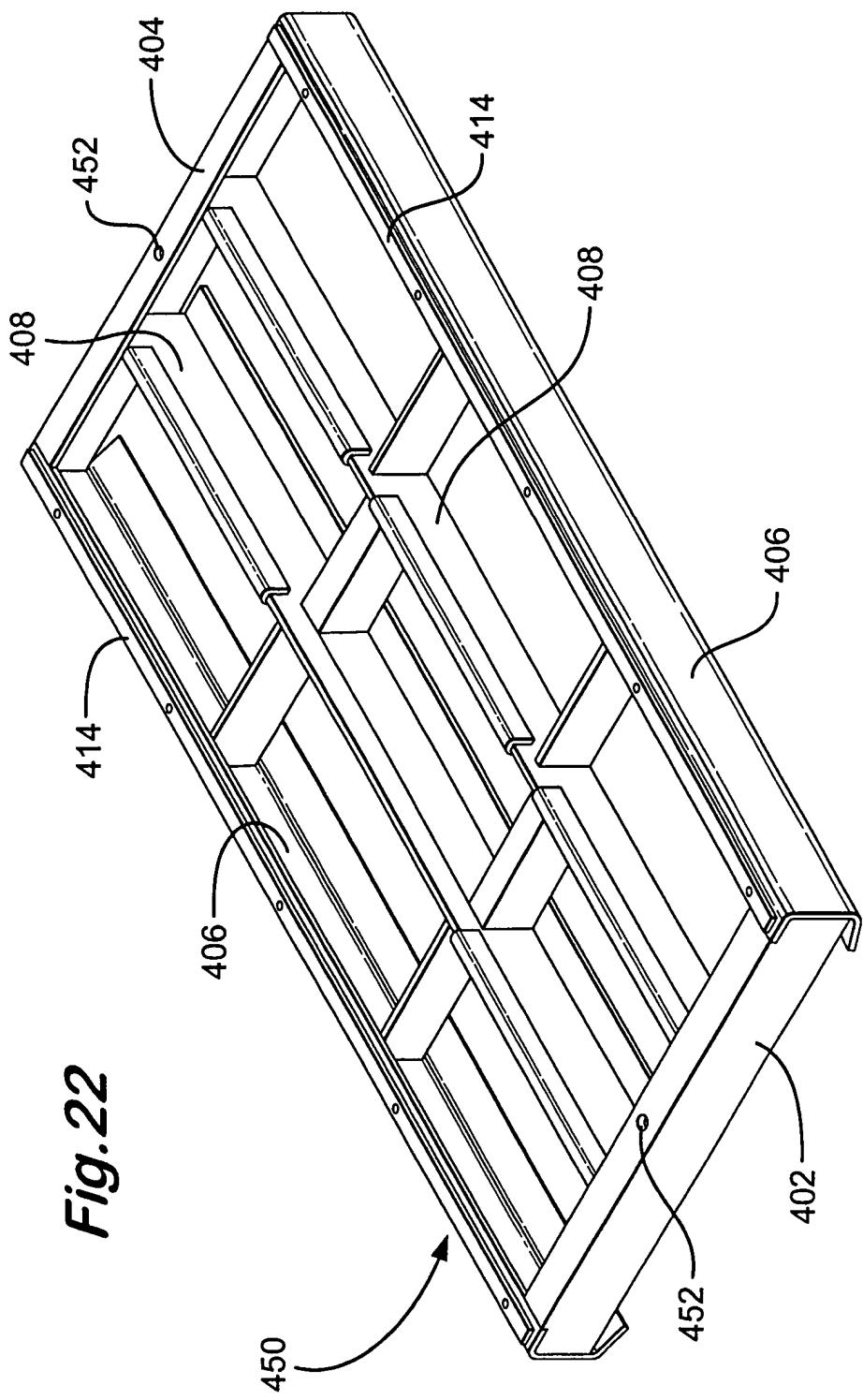


Fig. 22



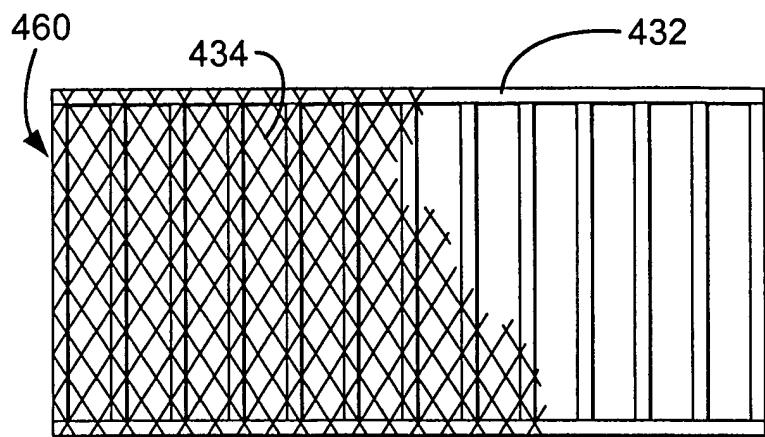


Fig. 23A

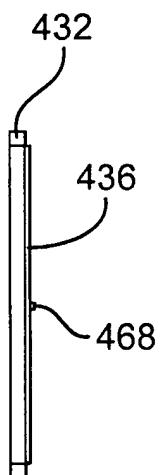


Fig. 23B

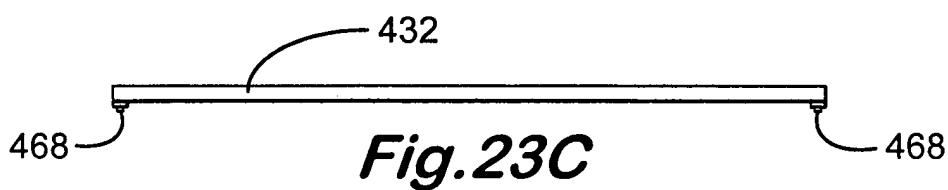


Fig. 23C

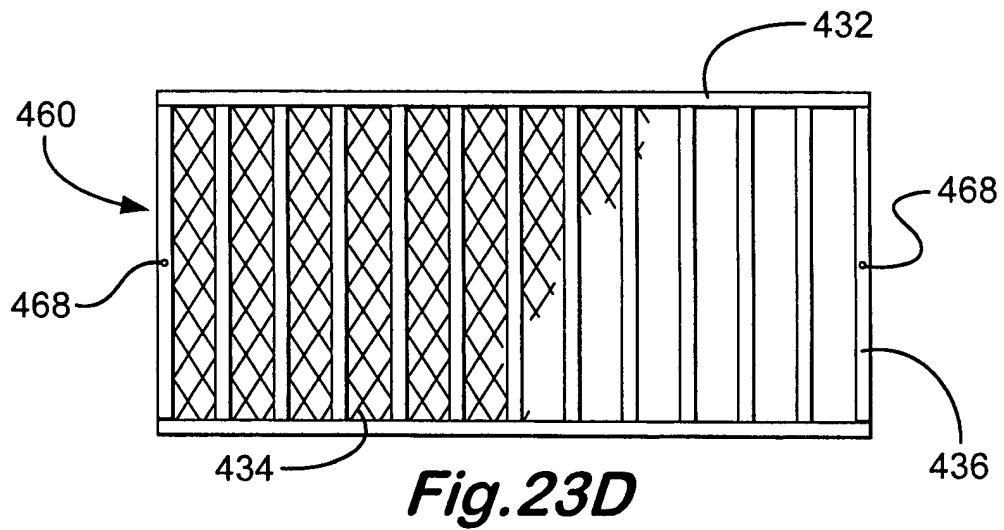


Fig. 23D

Fig. 24

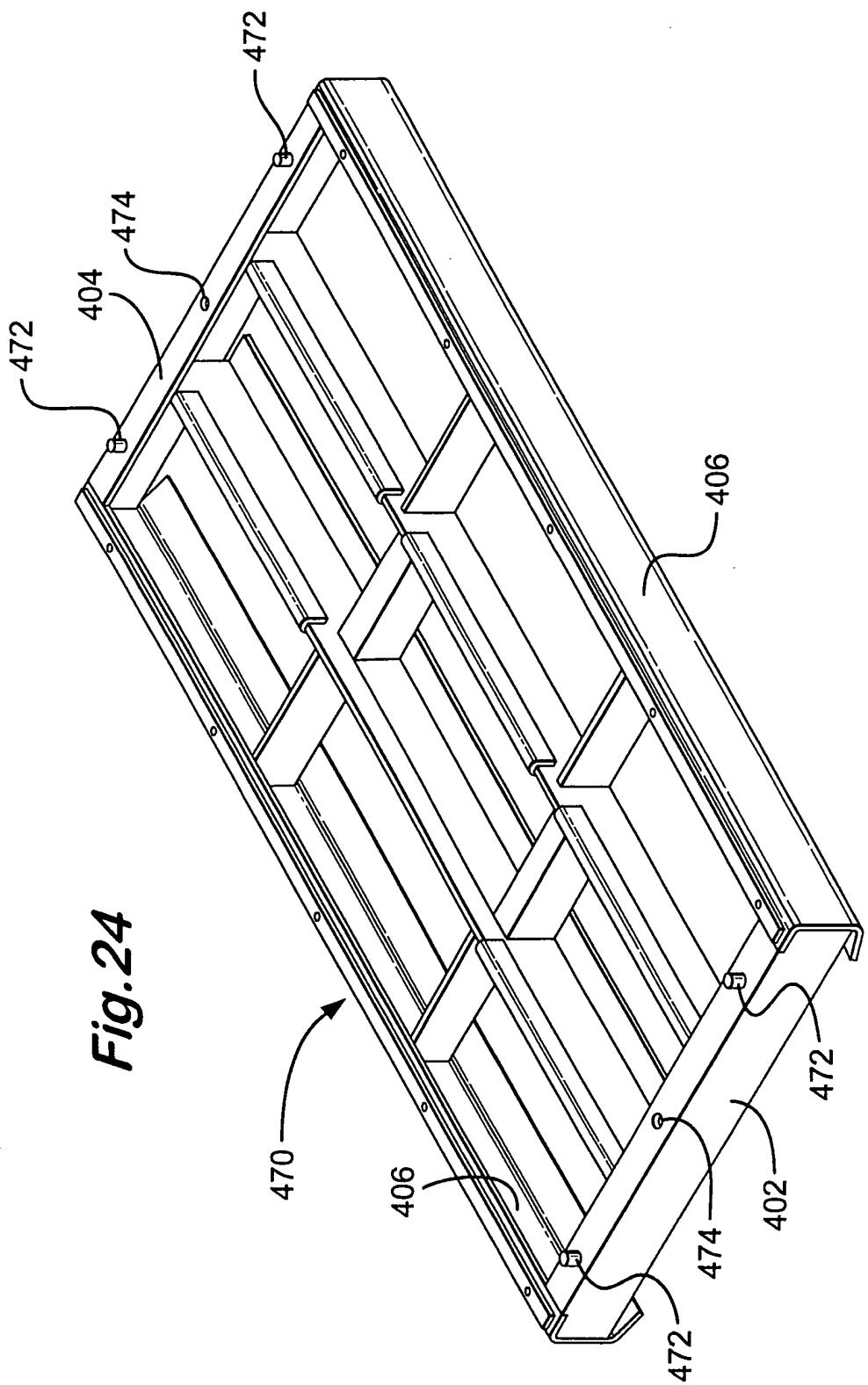


Fig. 25A

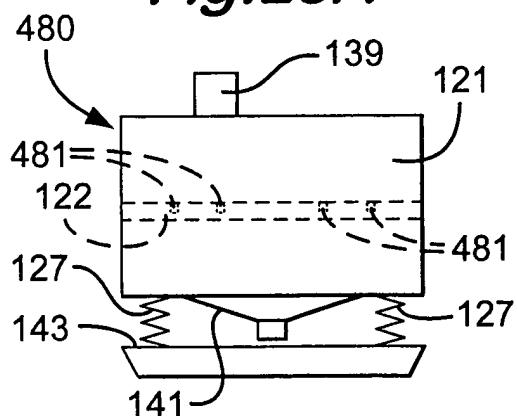


Fig. 25B

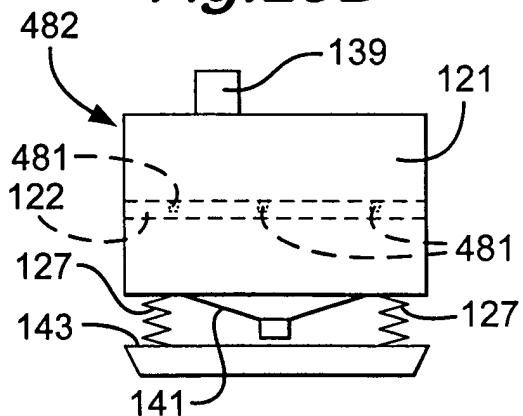


Fig. 25C

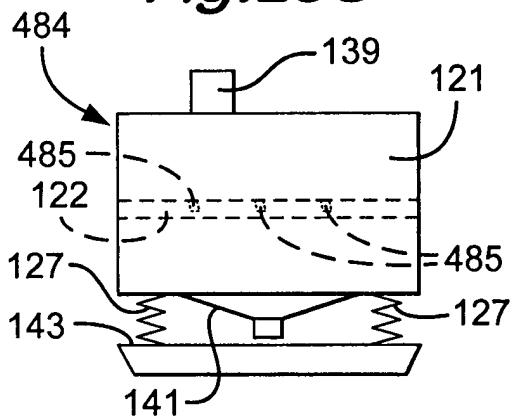


Fig. 25D

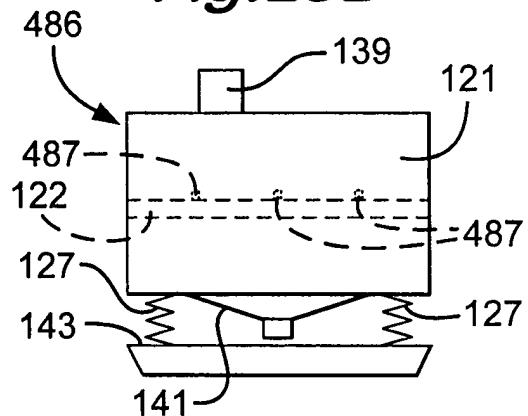


Fig. 25E

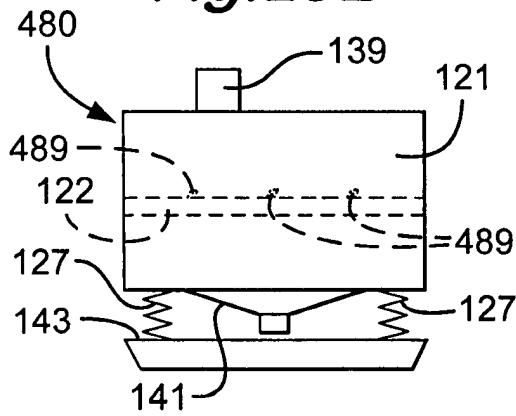


Fig. 25F

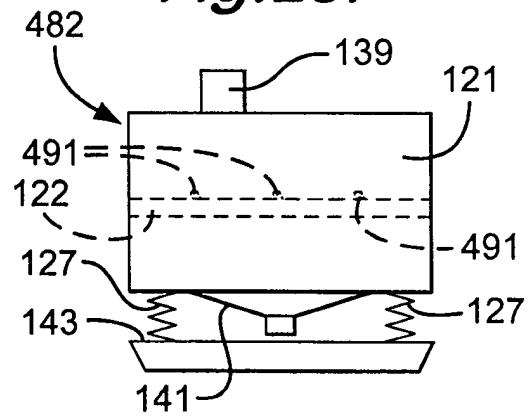


Fig.25H

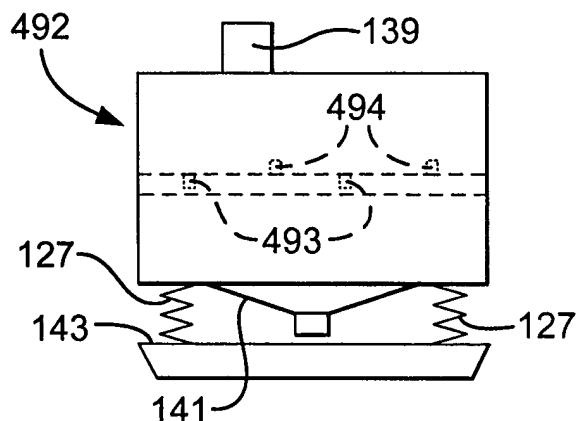


Fig.25G

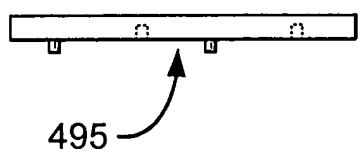


Fig.28

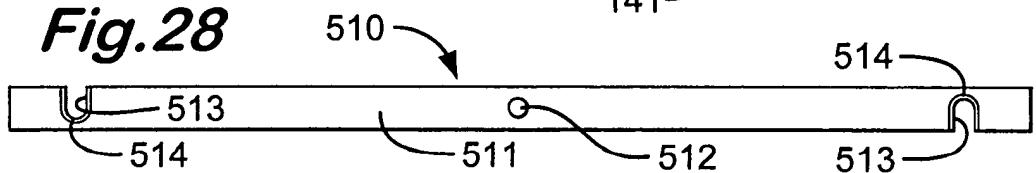


Fig.29A

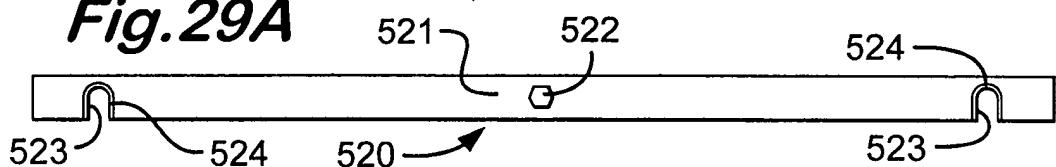


Fig.29B

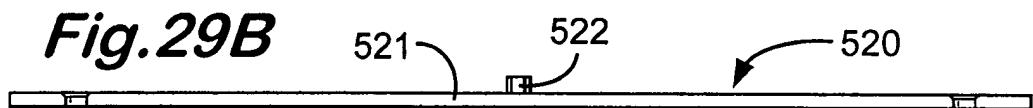


Fig.30A

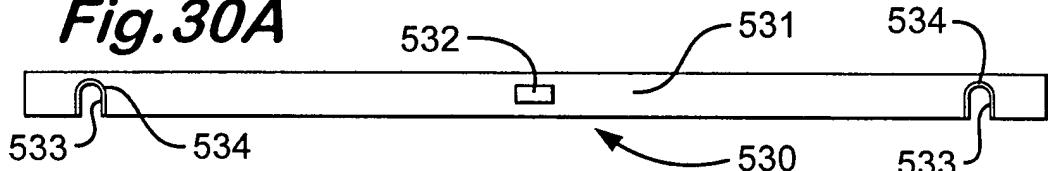


Fig.30B

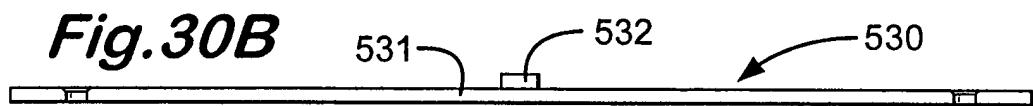


Fig.31A

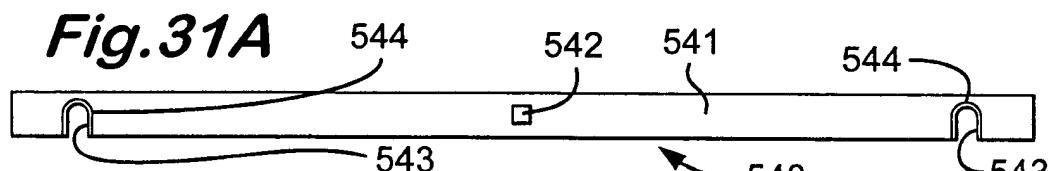


Fig.31B

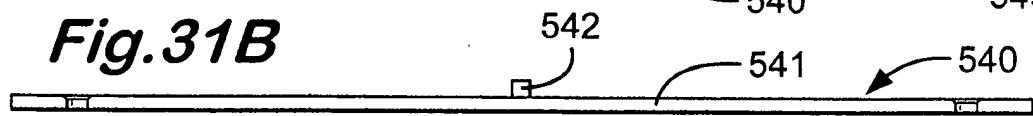
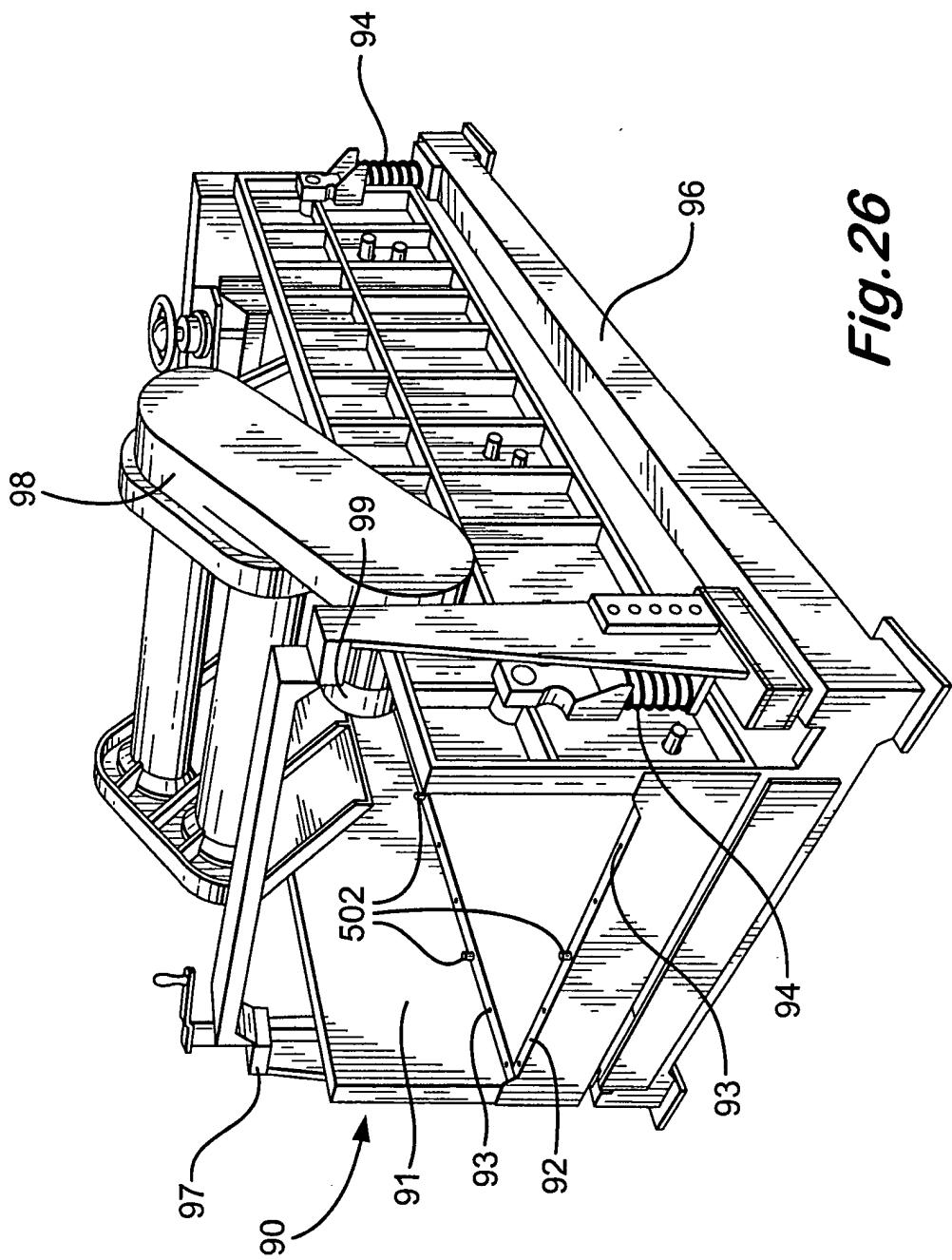


Fig. 26



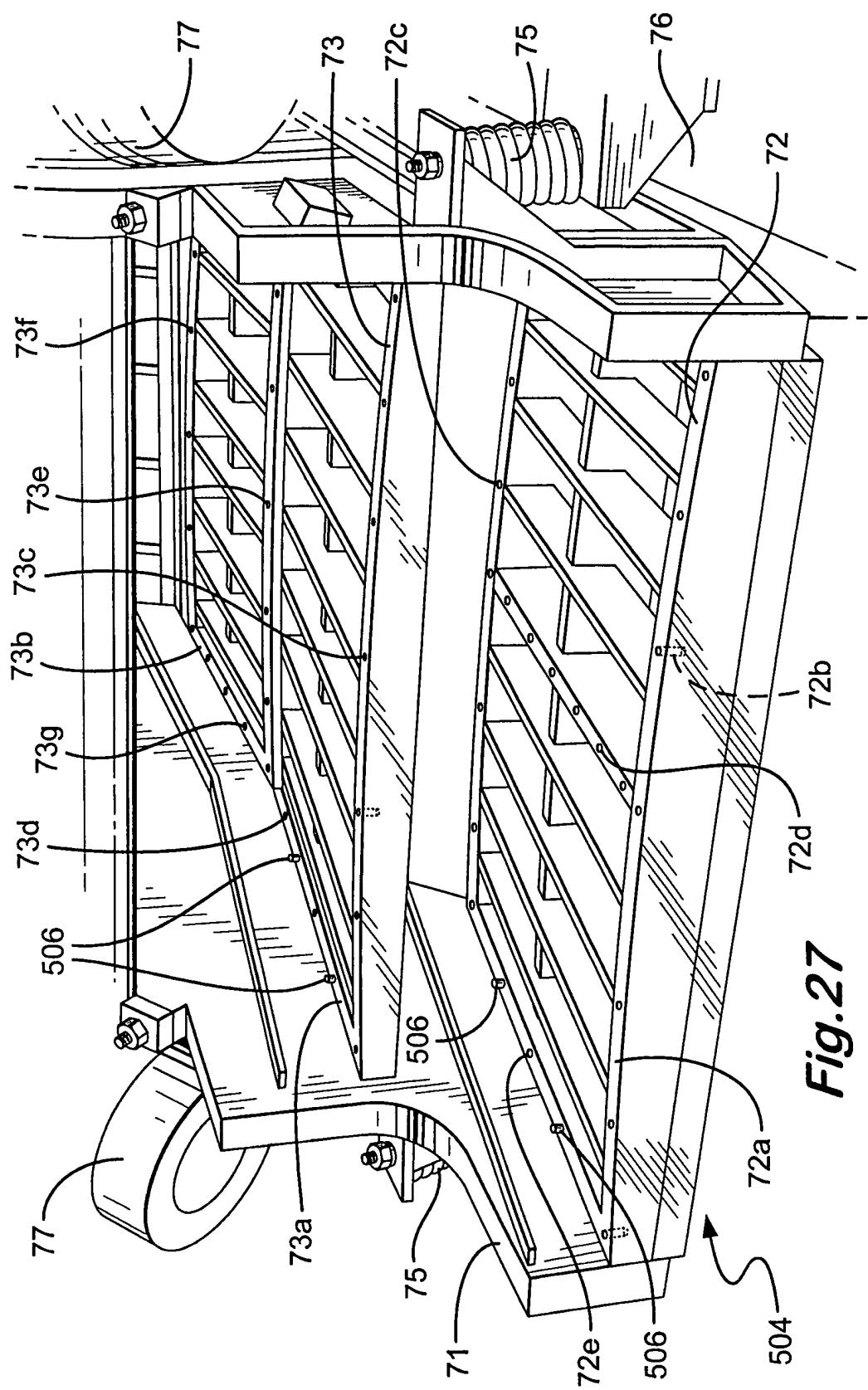


Fig. 27

Fig. 32A

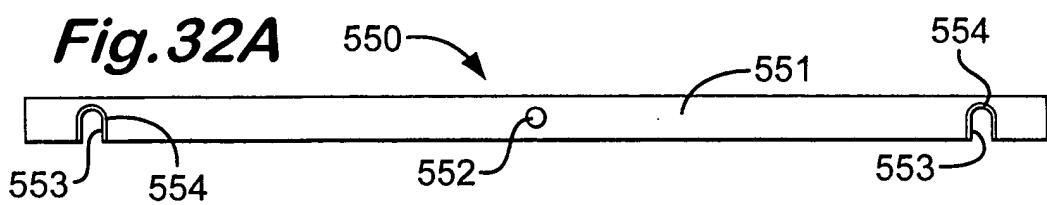


Fig. 32B

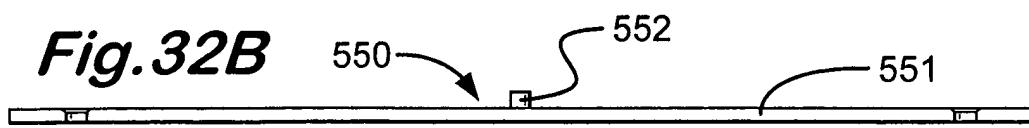


Fig. 32C

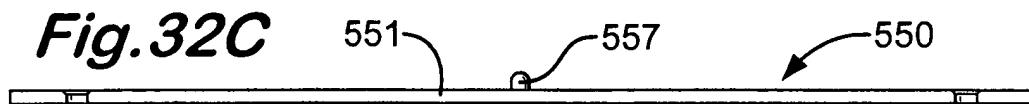


Fig. 32D

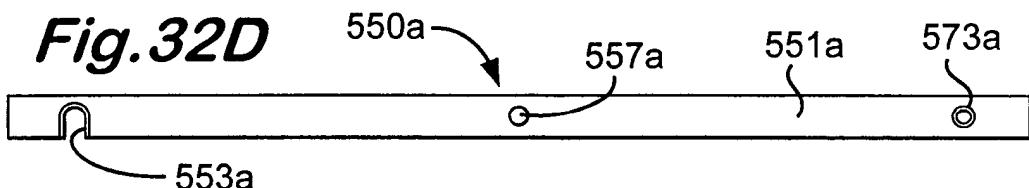


Fig. 32E

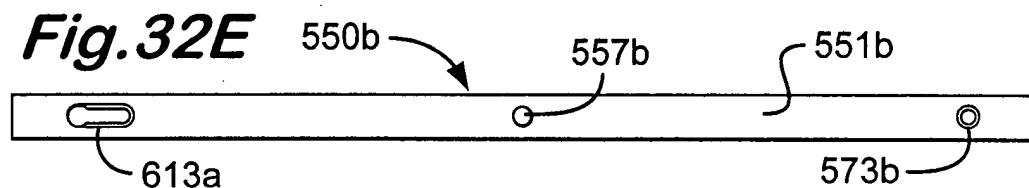


Fig. 34A

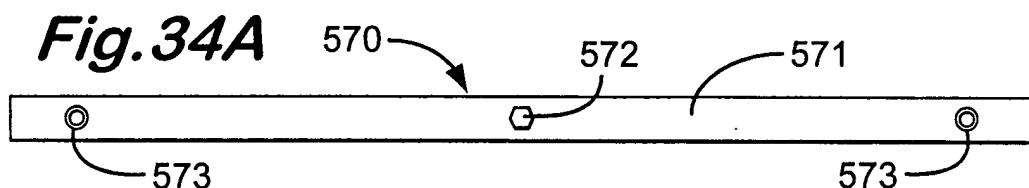


Fig. 34B

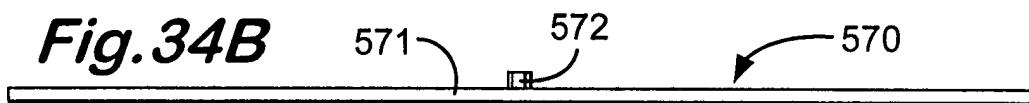


Fig. 35A

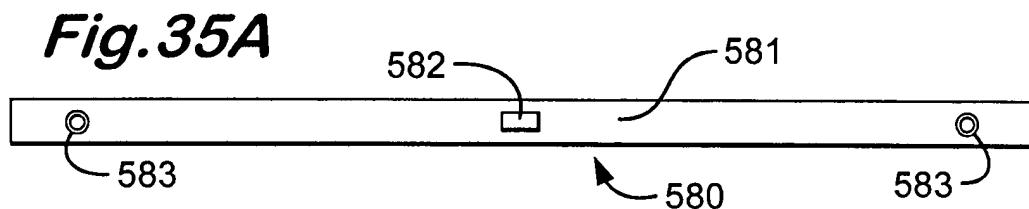


Fig. 35B

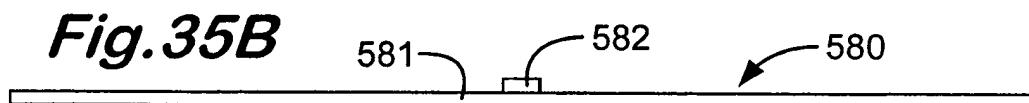


Fig. 33

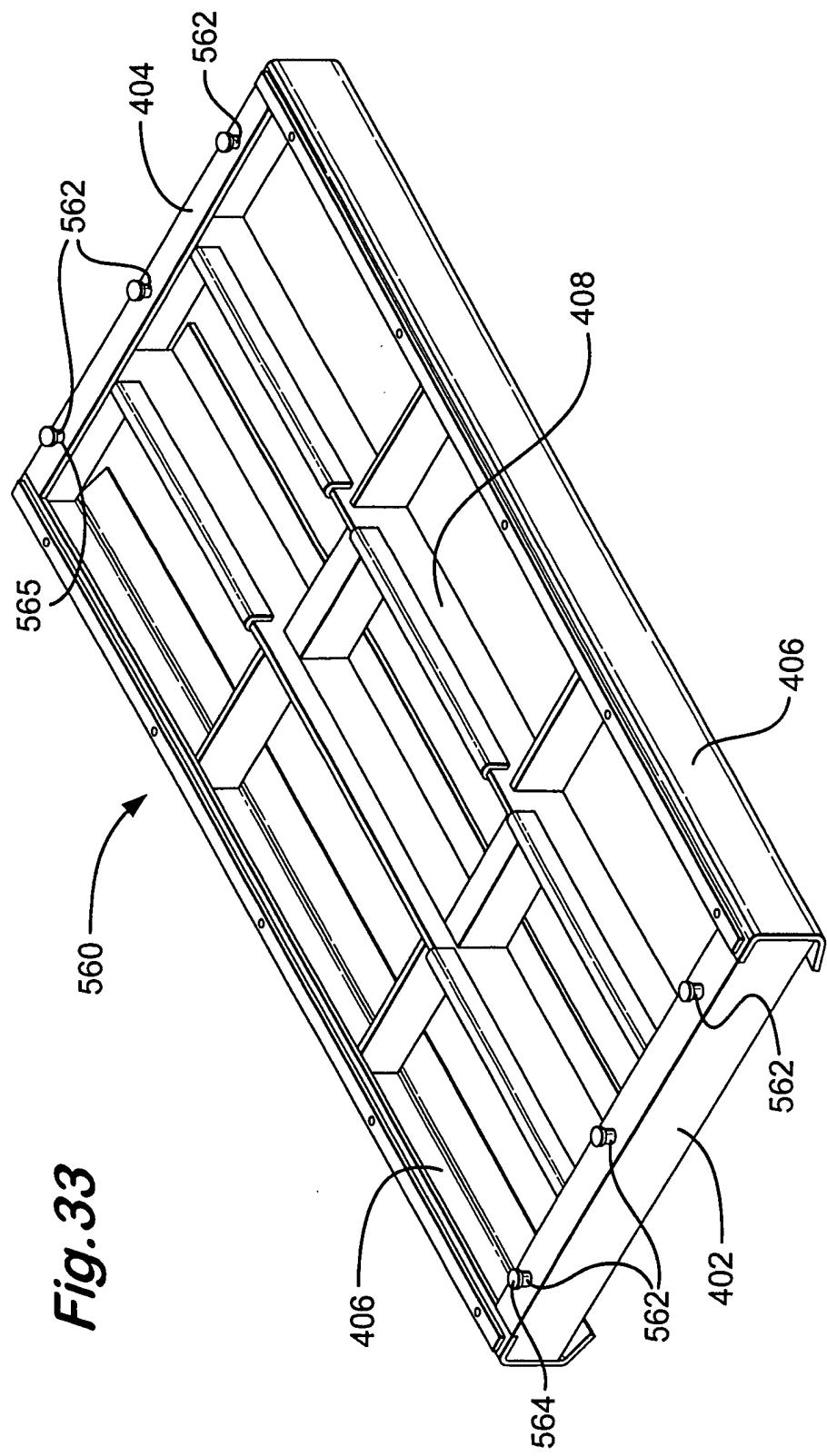


Fig. 36A

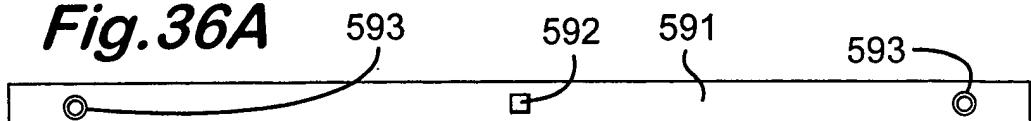


Fig. 36B

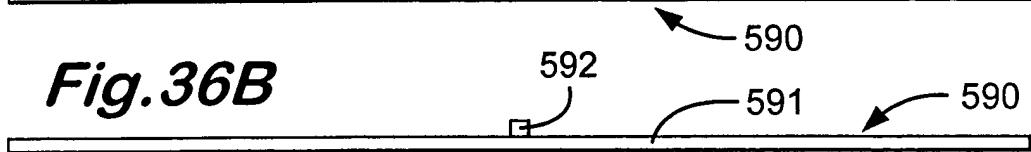


Fig. 37A

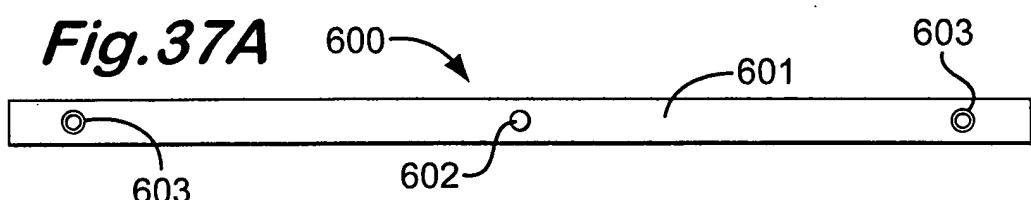


Fig. 37B

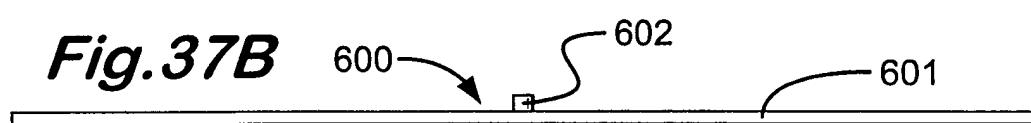


Fig. 38A

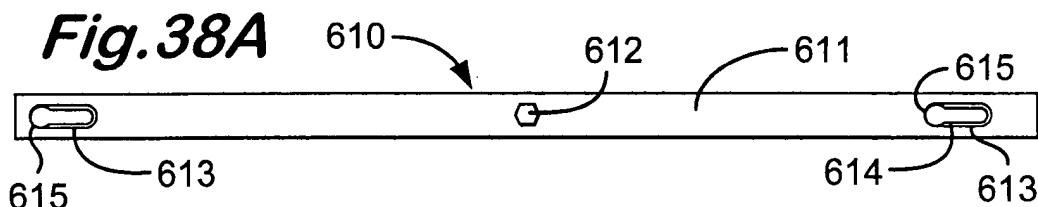


Fig. 38B

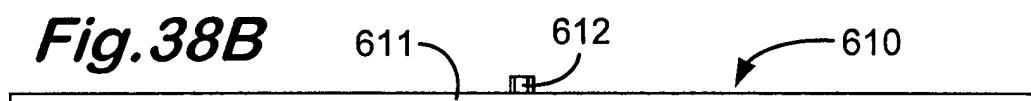


Fig. 39A

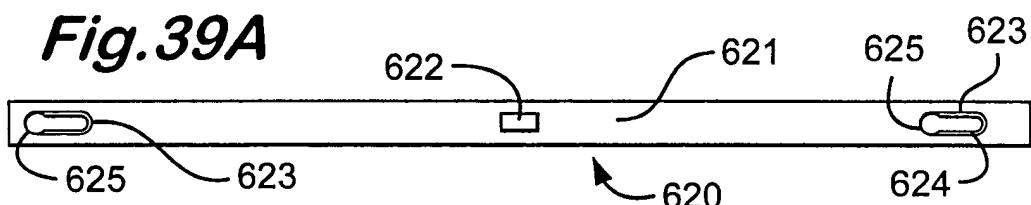


Fig. 39B

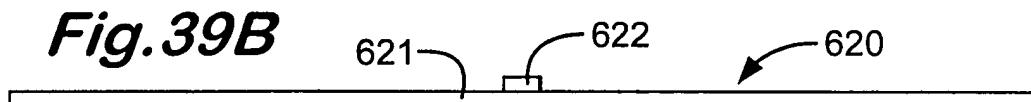


Fig. 40A

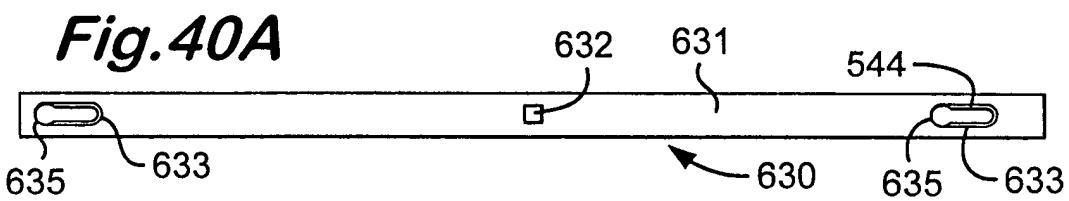
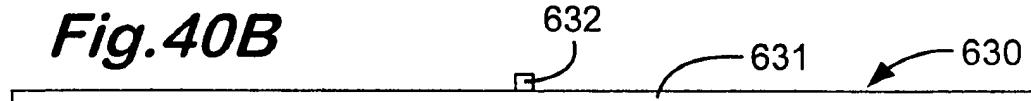


Fig. 40B



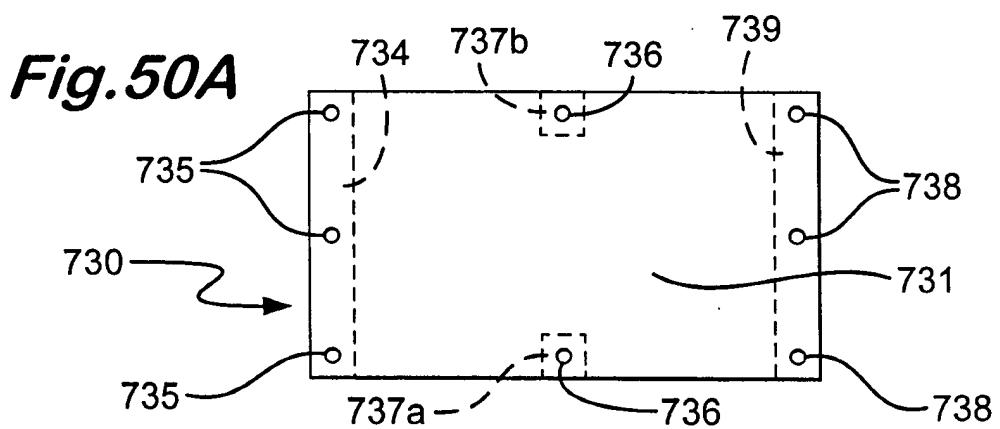
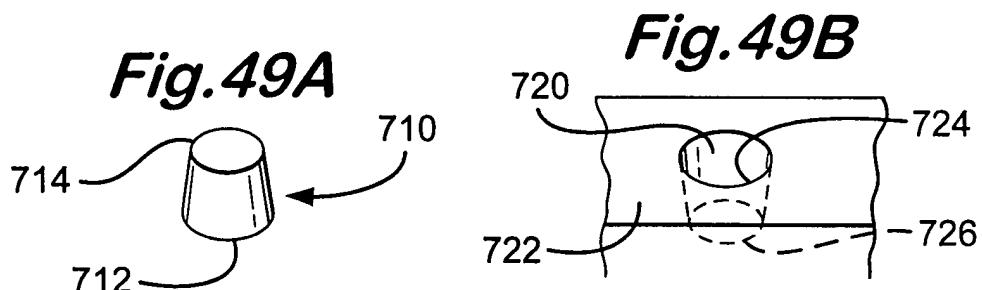
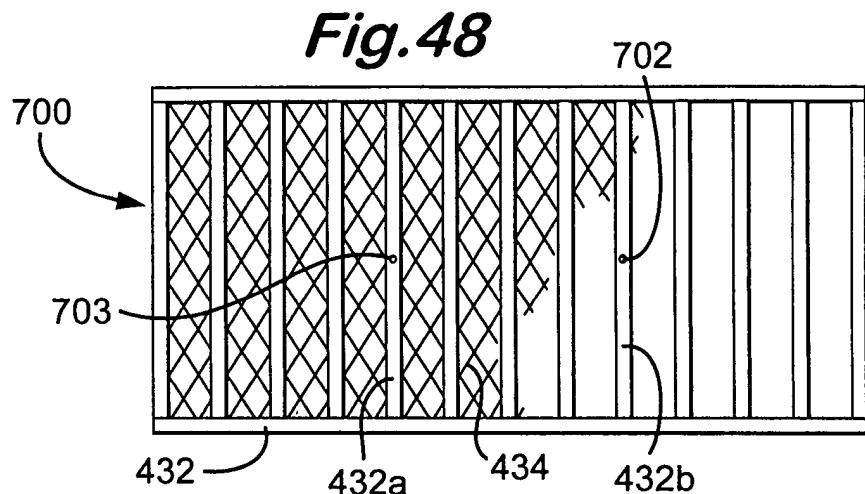
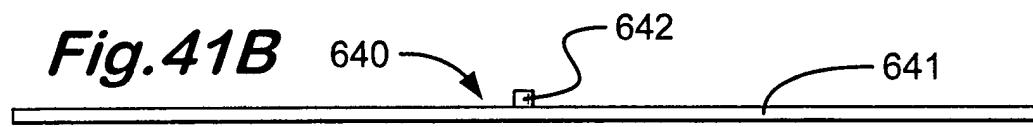
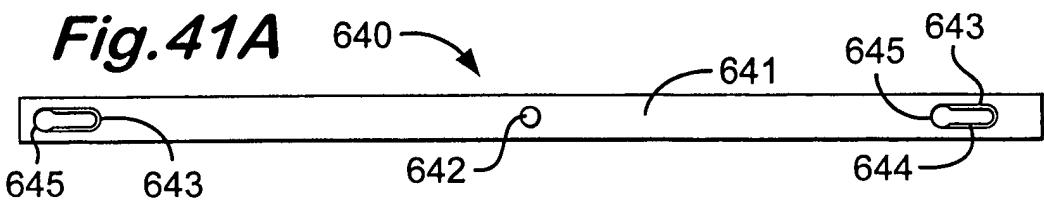


Fig.42

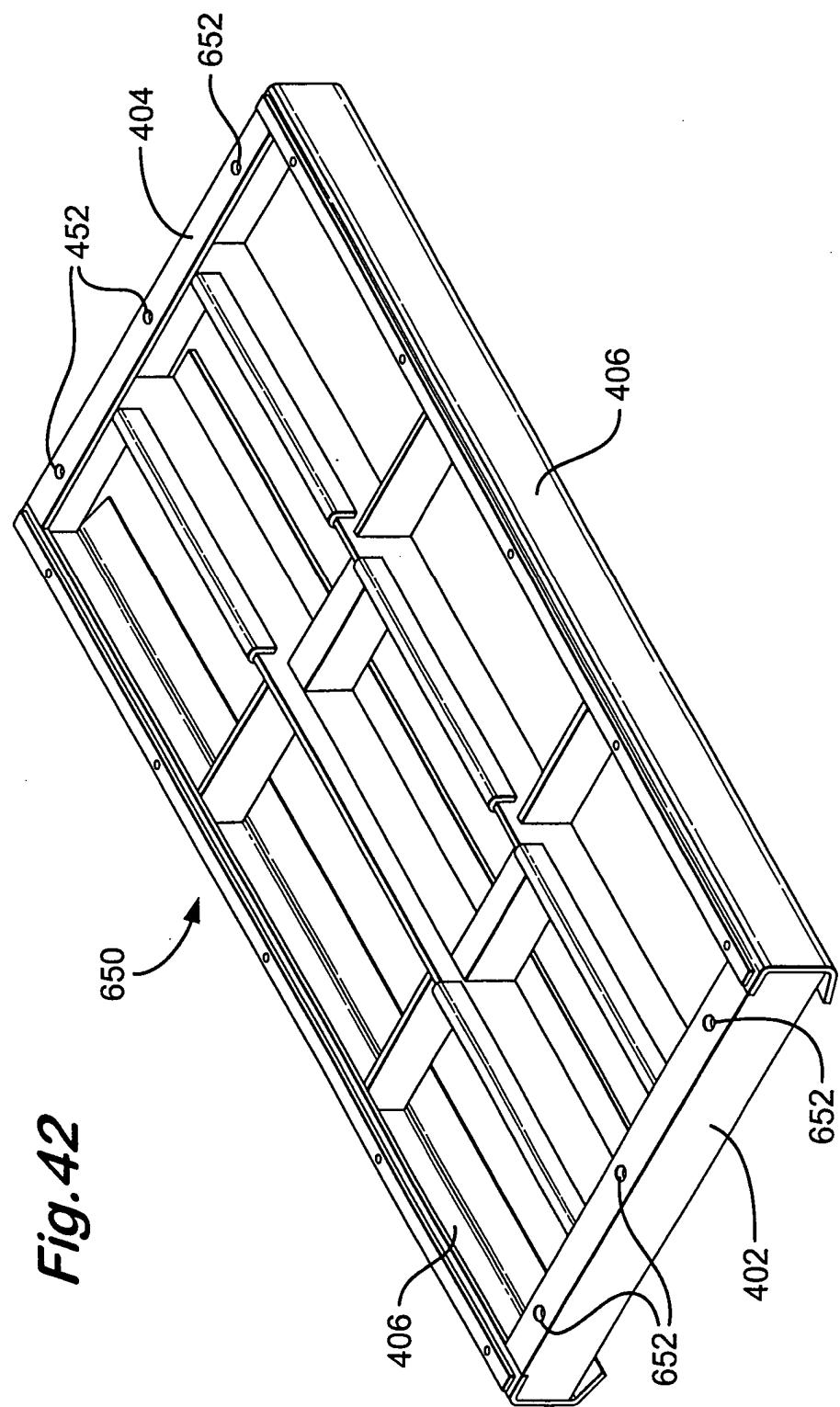


Fig. 43

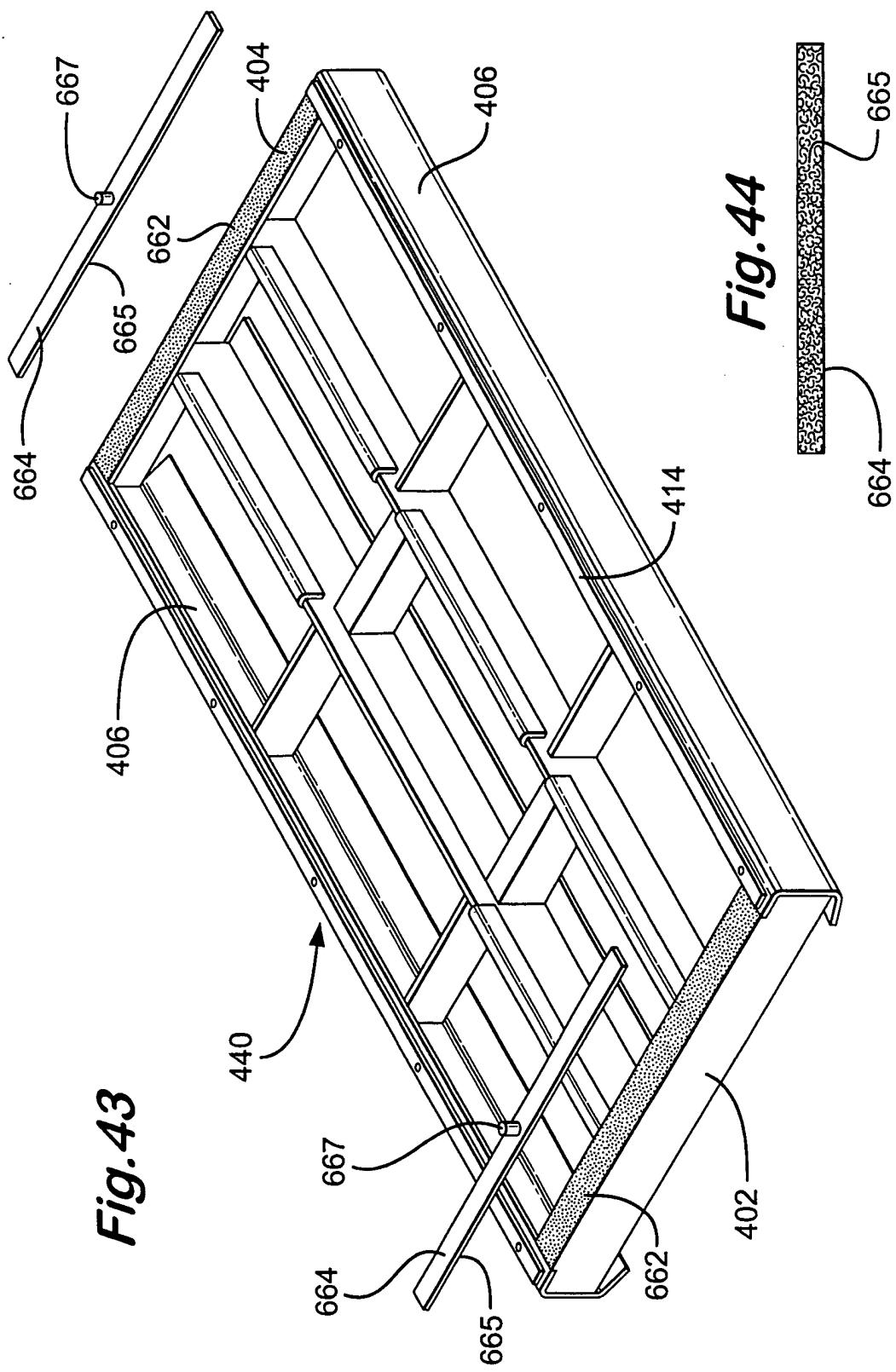


Fig. 44

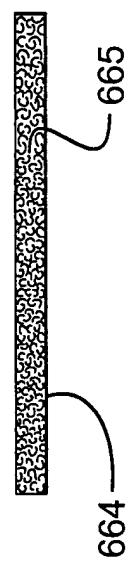


Fig. 45

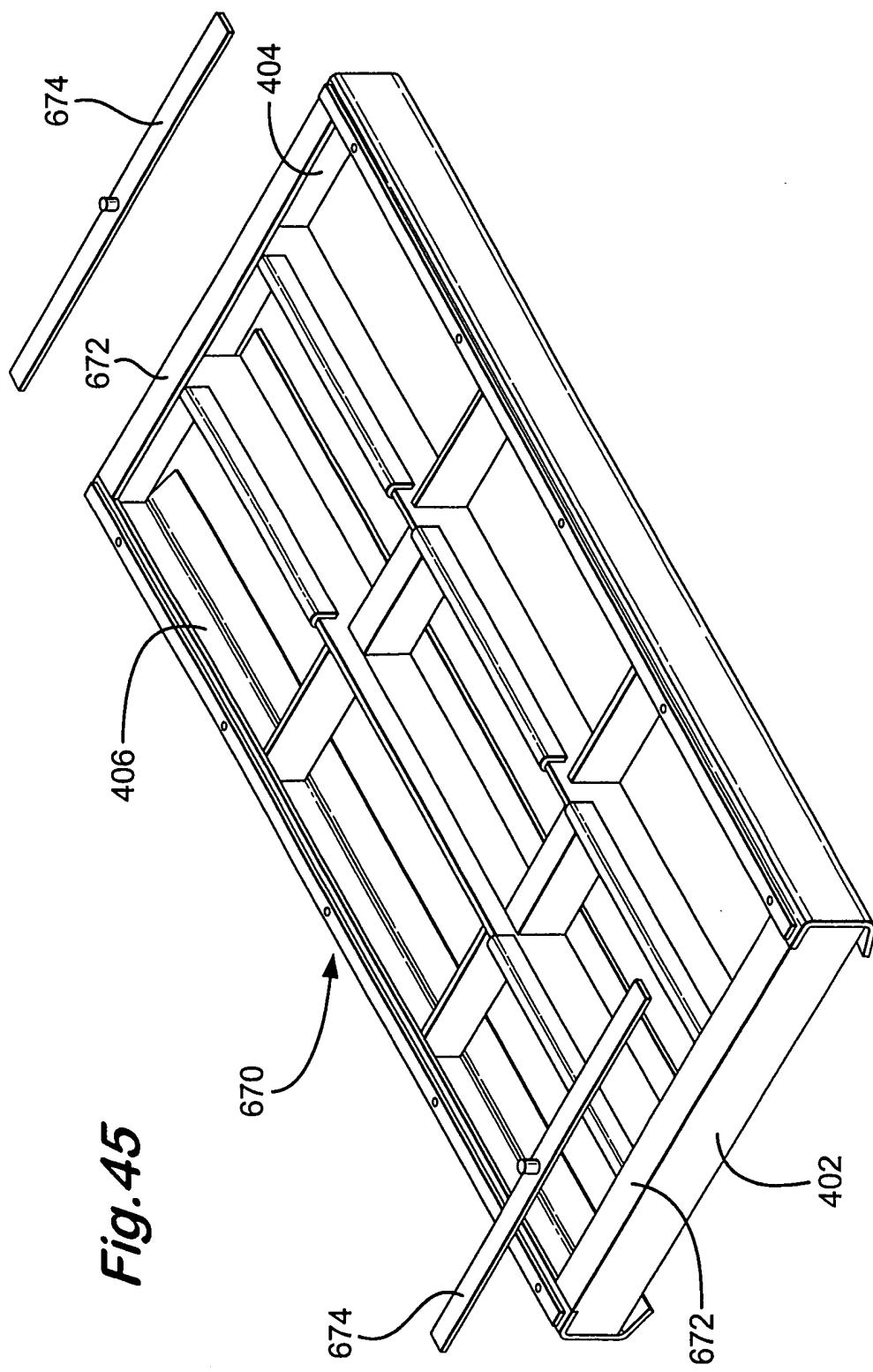


Fig.46

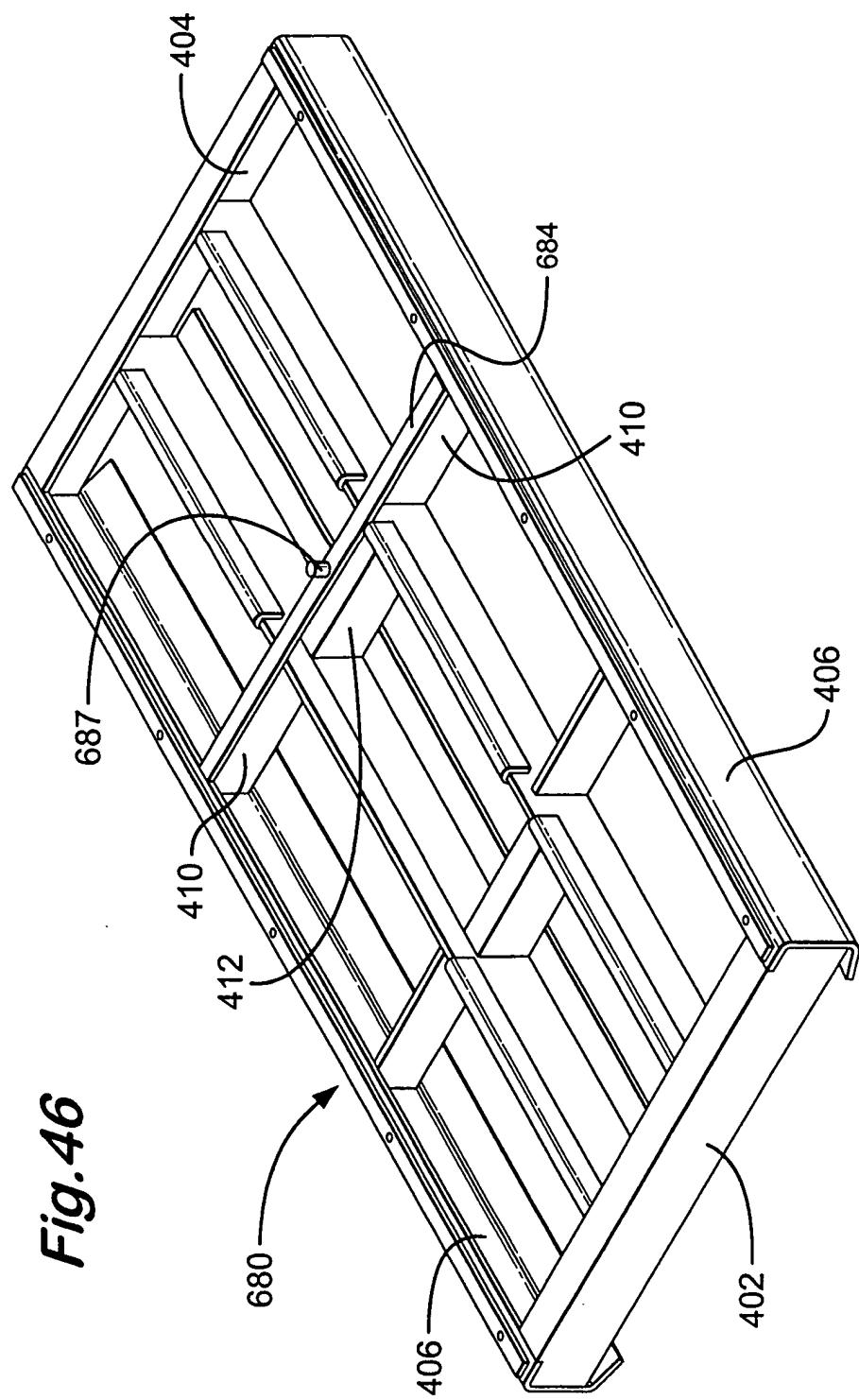


Fig. 47

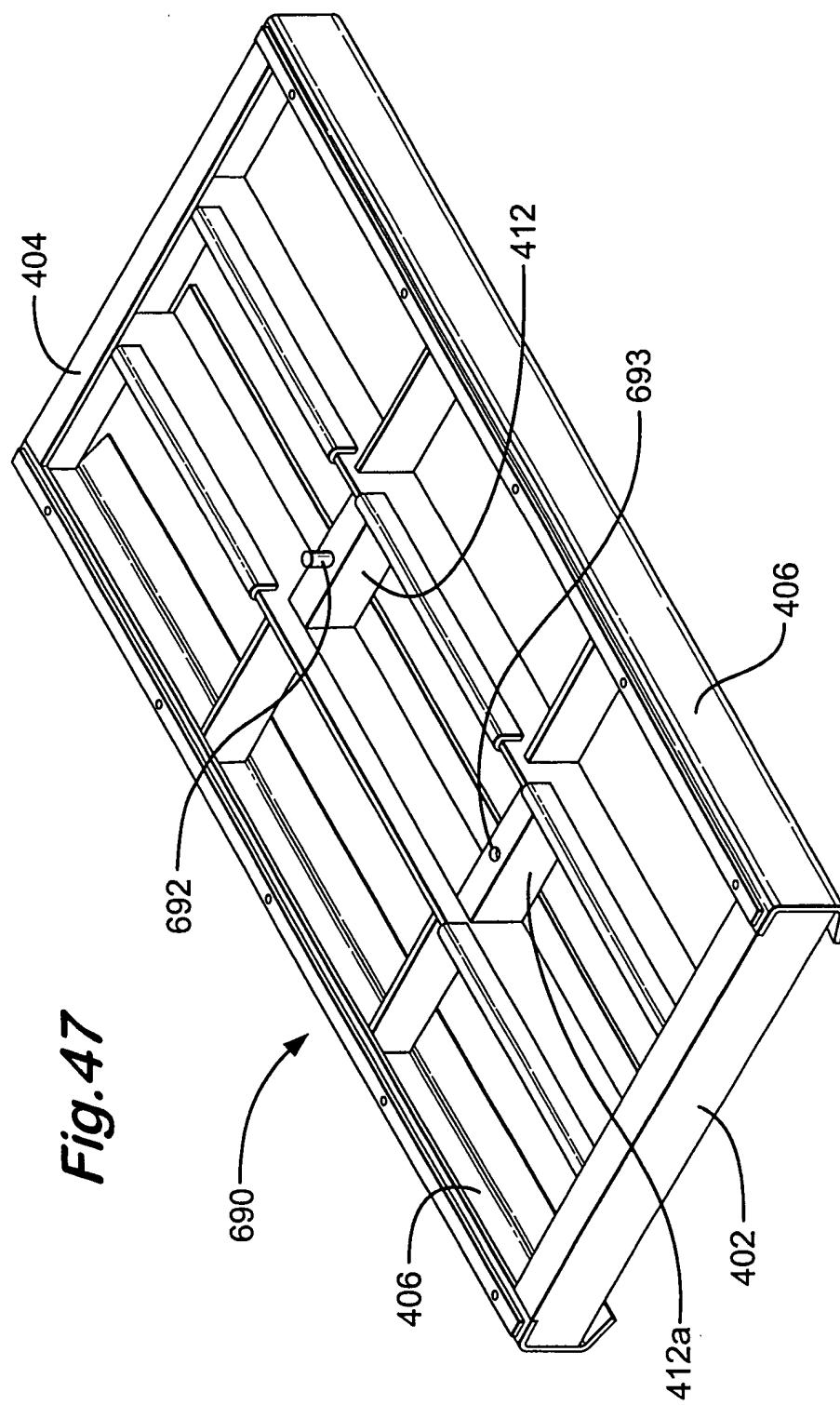


Fig. 50B

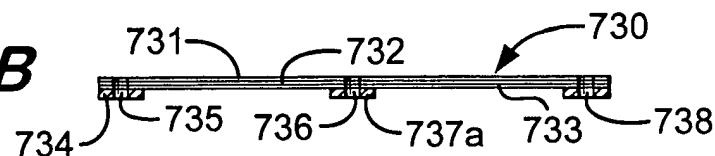


Fig. 50C

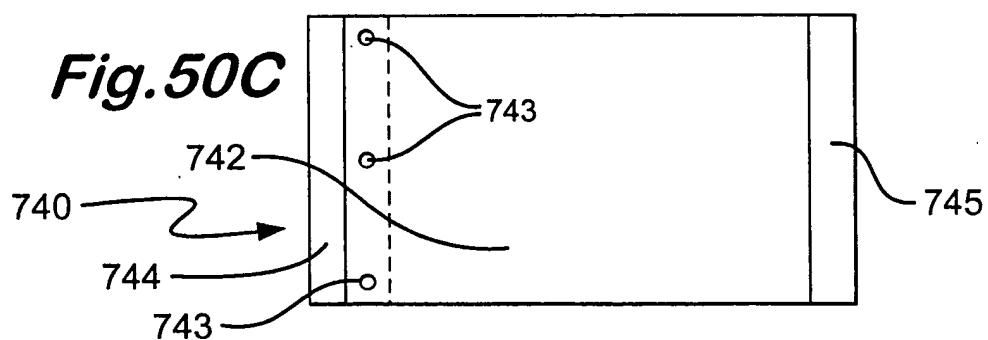


Fig. 50D

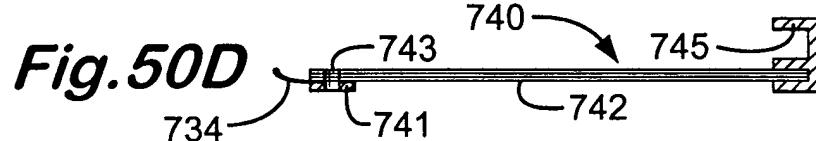


Fig. 50E

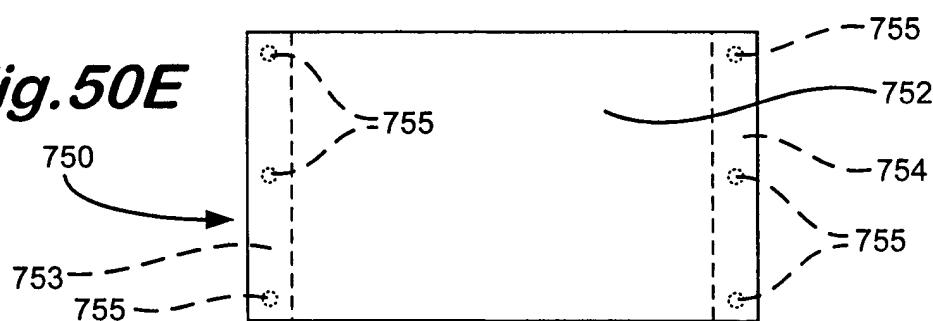


Fig. 50F

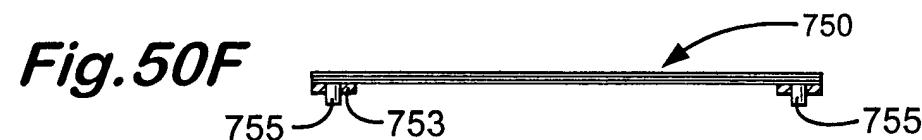


Fig. 50G

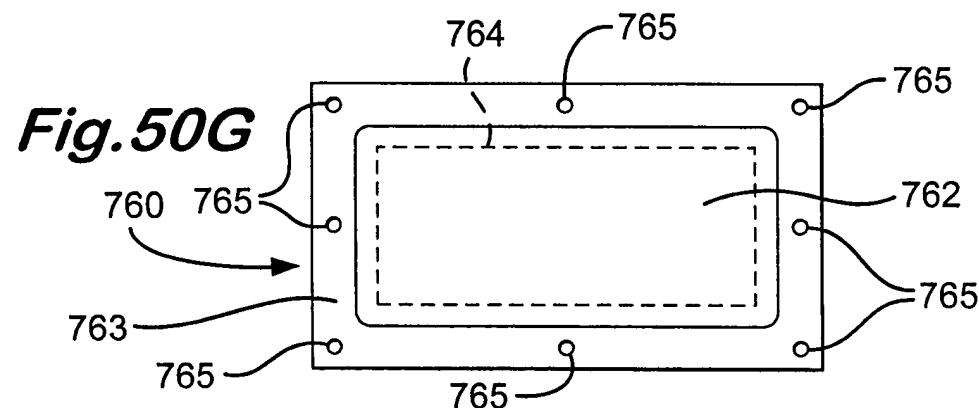


Fig. 51

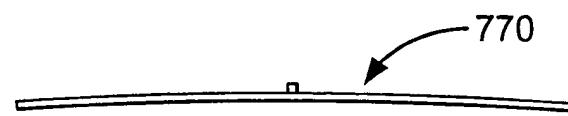


Fig. 52

PRIOR ART

SA→

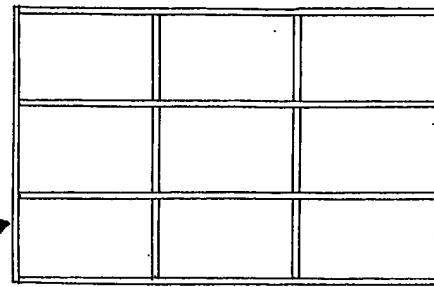


Fig. 53A

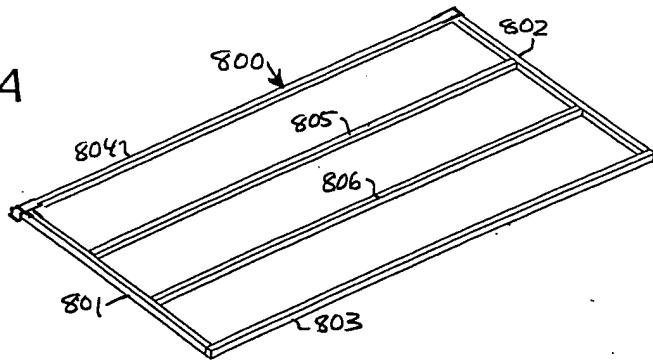


Fig. 53B

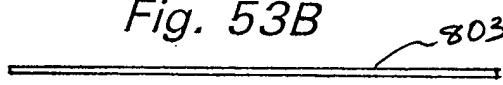


Fig. 53C

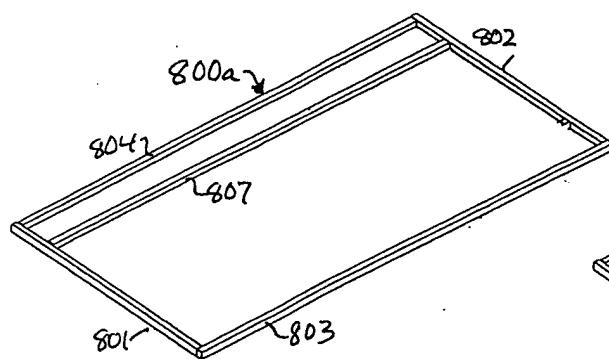


800a

804

807

802



800b

804

809

801

802

810

803

Fig. 54A

Fig. 54B

Fig. 54C

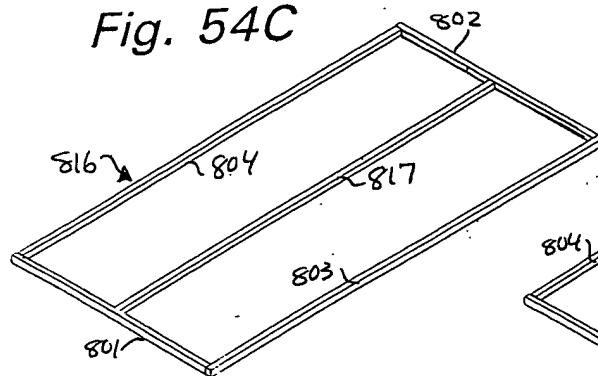


Fig. 54D

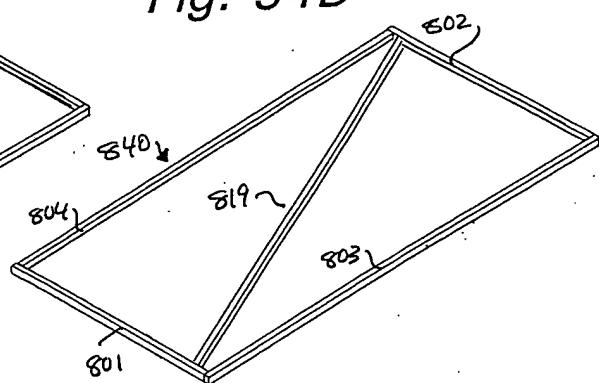


Fig. 55A

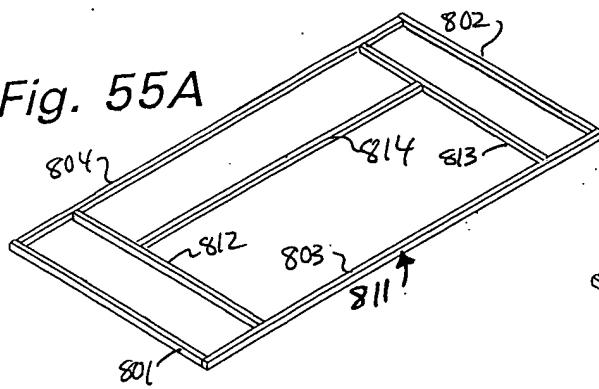


Fig. 55B

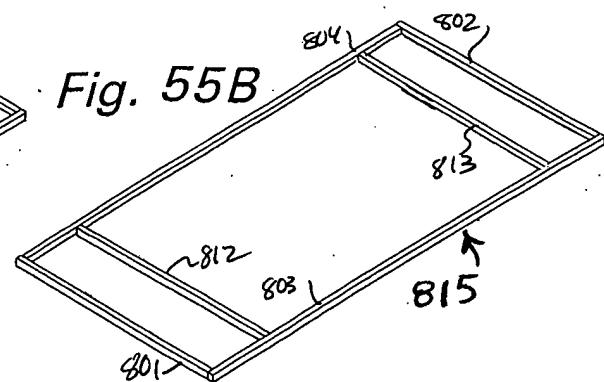


Fig. 56

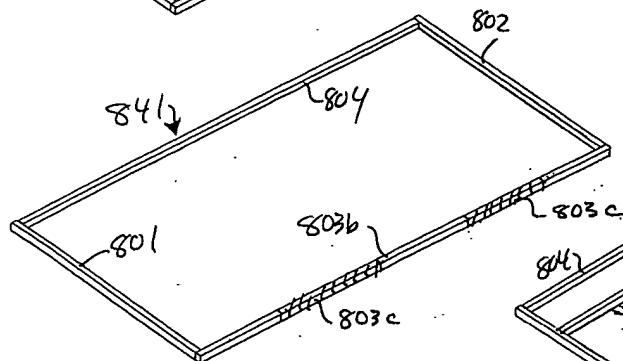
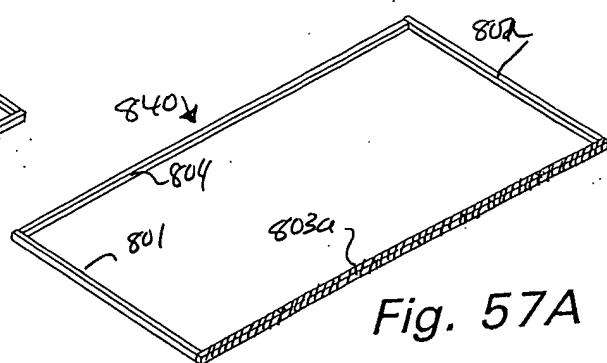
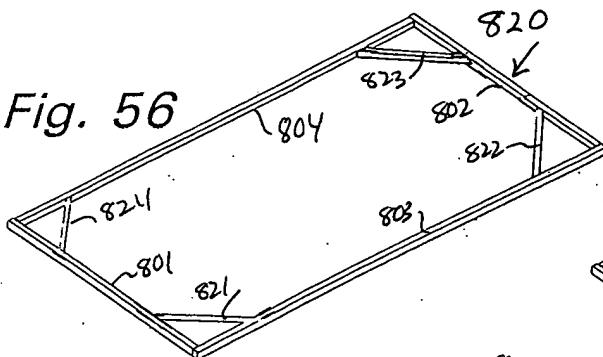


Fig. 57B

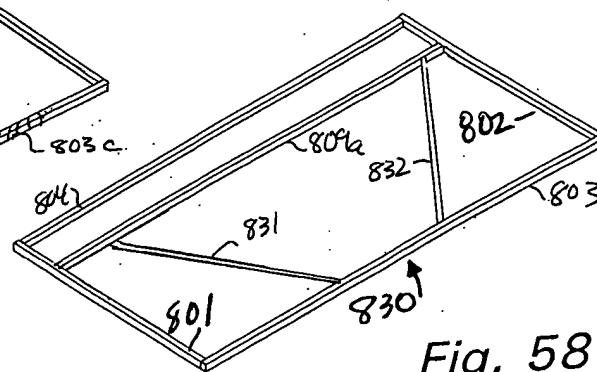


Fig. 58

Fig. 59

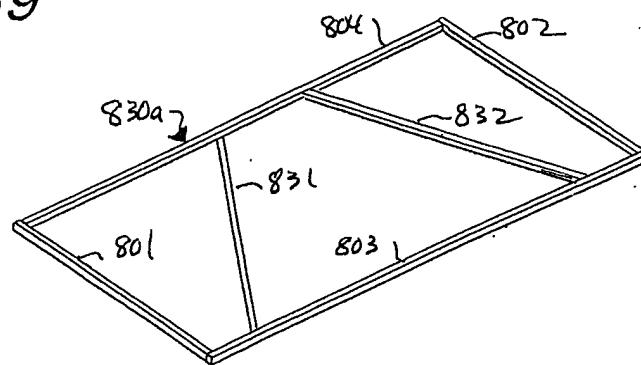


Fig. 60A

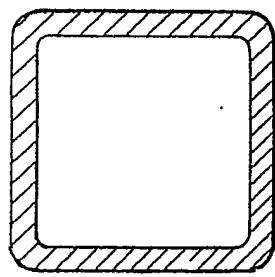


Fig. 60B

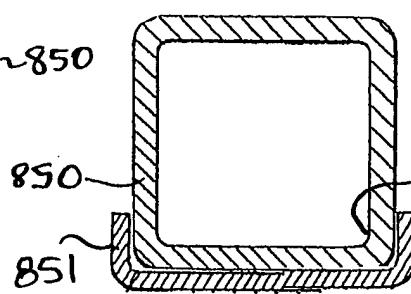
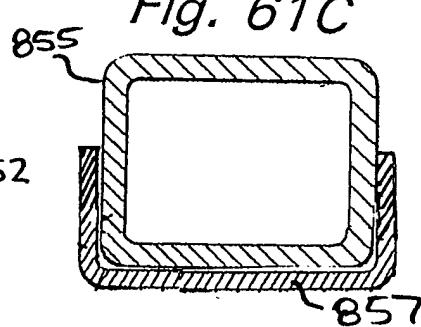


Fig. 61C



855

Fig. 61B

Fig. 61A

61C

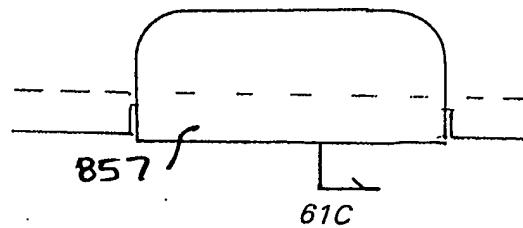
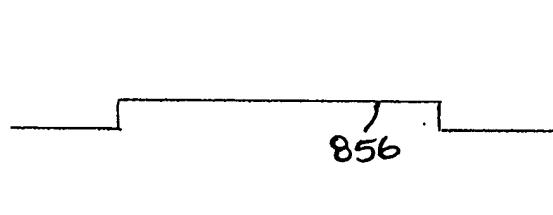


Fig. 62

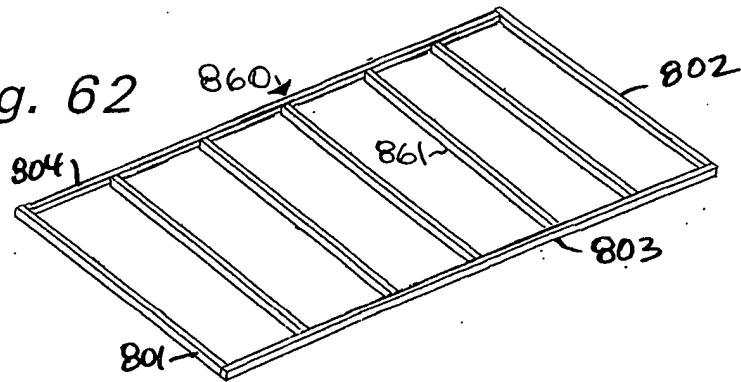


Fig. 63A

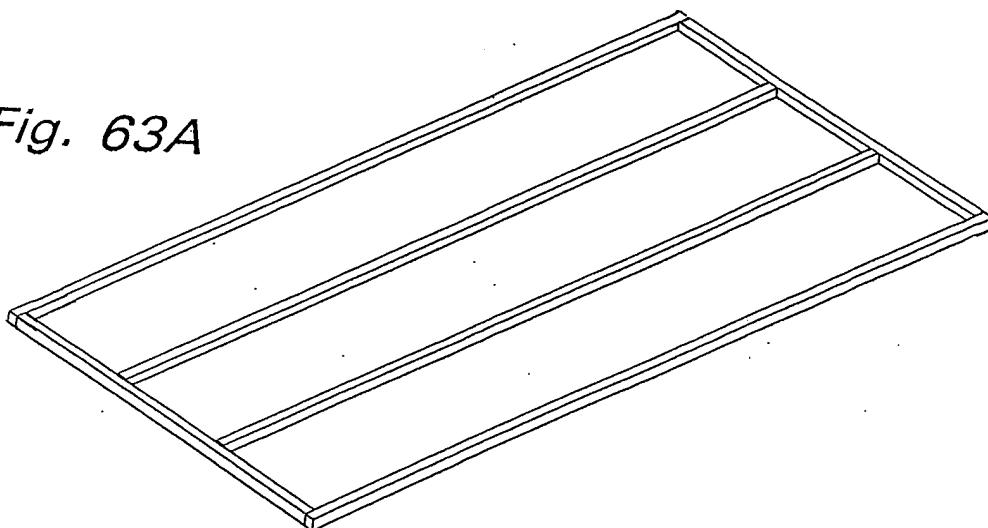


Fig. 63B

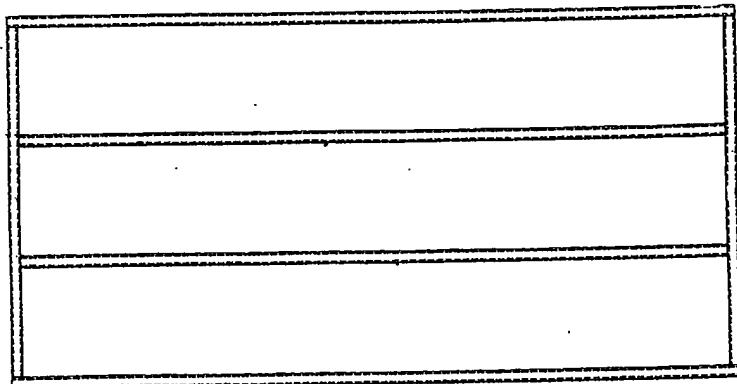


Fig. 63C

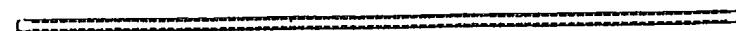


Fig. 63D

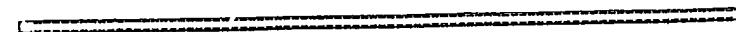


Fig. 63E

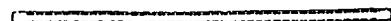


Fig. 63F

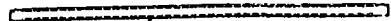


Fig. 64

